**Economics Education and Research Consortium**
**Working Paper Series**
**ISSN 1561-2422**


**No 03/09**

# Transition to Postindustrial Society

## A Study of the Service Sector Employment in Russia

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This project (01-132) was supported
by the Economics Education and Research Consortium



Research area: **Labor Markets and Social Policy**

**JEL Classification:** J63, L80, P20

**LUKYANOVA A.L. Transition to Postindustrial Society? A Study of the Service Sector Employment in Russia.** — Moscow: EERC, 2003. — pp 1–53.

The transition to market economic systems in the countries of Central and Eastern Europe and the former Soviet Union involves fundamental shifts in the sectoral allocation of resources, in particular, dramatic changes in employment structures. Development of services in Russia turns to be more impressive than in many other transitional countries. This paper uses the Baumol-Fuchs model of the service sector expansion to estimate underdevelopment of services in Russia prior the transition and measure the progress in catching-up that has taken place thus far. Based on the Russian Longitudinal Monitoring Survey (1994-2000) empirical analysis demonstrates that sectoral variation in the difference between withdrawal from and entrance to the labor force is the main reason of changing distribution of labor. For job-to-job transitions low quality of current job matches, tenure effects and labor market segmentation are the most important explanation of inter-sectoral labor mobility.

**Keywords.** Russia, transition, labor mobility, sectoral restructuring, services.

**Acknowledgements.** The author is grateful to Reuben Gronau, Rostislav Kapeliushnikov, and Klara Sabirianova for their helpful comments, Temir Burzhubaev for providing the data. Special thanks are for Klara Sabirianova and the Davidson Data Center and Network at the University of Michigan Business School for providing the data on the RLMS industry codes.

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## 1. INTRODUCTION

Most discussion of the service economy suggests that changes in technology and the secular rise in living standards will cause the sectoral mix of employment to evolve in a similar manner in all countries. Now it is a common knowledge that pre-reform employment structures in formerly socialist economies were very different from those in market economies. In comparison with market economies at the same or lower levels of development, socialist countries had disproportionally large shares of employment in agriculture, mining, and manufacturing. Services, in particular trade and business services, were underdeveloped because of public instead of private provision. Even social services including health, education, and public administration employed fewer people than in market economies. But in the long run the structure of employment in transitional countries is expected to become more or less the same to that in advanced market economies. Hence, large-scale reallocation of labor across broad industrial sectors is one of the fundamental objectives of economic restructuring.

In fact, structural changes began long before transition. For example, in Russia service employment has grown steadily since the mid-1960s reaching 45.9% of all jobs in economy in 1990. Reallocation dramatically accelerated in the transition period. As a result, the Russian service sector is currently employing at least as many workers as two other major sectors - industry and agriculture - altogether. There is another striking side of the service employment 'miracle': despite drastic output decline in economy, job creation exceeded job destruction in services. Table 1 shows that the service sector has been the only one experiencing the absolute growth of employment during the transition period.

In this paper I analyze the process of reallocation of labor from agriculture and industry to the service sector during transition. The objective of this study is to answer the following questions. How much change in the structure of employment was ‘required’ prior the transition? To what extent has Russia succeeded in its movement towards post-industrial service-oriented employment structure so far? The service sector itself is not homogenous: it includes the whole range of jobs from manual personal services to high-quality innovative business services. Therefore, it is interesting to study in detail the composition of the service sector and specific features of employment patterns in various service sub-sectors.

Large-scale movement of labor into the service sector is mainly achieved by the mobility of workers who find new jobs in the tertiary sector. Prior to reforms labor mobility in Eastern Europe was roughly of the same magnitude as in many Western European countries, but the bulk of this mobility took the form of people moving between basically similar jobs within the same sector (see e.g. Commander *et al*, 1995). Thus, even high labor mobility may not contribute to labor reallocation across sectors. This puzzle implies that analysis of macroeconomic forces of labor reallocation should be accompanied with analysis of worker flows at the micro-level.

**Table 1.** Evolution of employment by branches of economy, in per cent.

| | 1970 | 1980 | 1990 | 1997 | 1998 | 1999 | 2000 | Change (1970-1990) | | Change (1990-2000) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | ths. pers. | % | ths. pers. | % |
| Total employment | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 11,319 | 17.7 | -10,998 | -14.6 |
| Industry and construction | 41.8 | 42.1 | 42.3 | 31.8 | 30.2 | 30.3 | 30.4 | 5,070 | 18.9 | -12,284 | -38.6 |
| Agriculture and forestry | 19.5 | 15.0 | 13.2 | 13.7 | 14.0 | 13.7 | 13.4 | -2,538 | -20.3 | -1,356 | -13.6 |
| Service sector | 37.1 | 40.9 | 41.4 | 51.9 | 53.1 | 53.1 | 53.1 | 7,421 | 31.2 | 2,954 | 9.5 |
| Other branches | 1.5 | 2.0 | 3.1 | 2.7 | 2.7 | 2.9 | 3.2 | 1,367 | 139.1 | -312 | -13.3 |

*Note*: Sectoral distribution follows the OKONKh definition

*Source*: Author's calculations from Goskomstat (2001a): Table 6.6

The reminder of this paper is organized as follows. Section 2 reviews the theoretical literature explaining the growth of service employment and summarizes empirical studies of the service sector development in the USSR prior reforms and in other transitional countries in the 1990s. Section 3 focuses on definition and measurement of service employment with particular reference to comparability of international and national classifications. Section 4 builds a model and gives empirical estimates of the service gaps in Russia for the service sector as a whole and for the specific service sub-sectors. Section 5 examines reallocation of labor towards services at the level of individual decisions. Finally, section 6 concludes.

## 2. REVIEW OF RELATED LITERATURE

In his seminal book, Fuchs (1968) proposed three explanations for the expansion of the service sector:

1. The income elasticity of demand for services is greater than unity so as real per capita income increases, consumption of services per capita and (ceteris paribus) employment in services grows more than the proportional increase in income[1];
2. As income raises it becomes more efficient to contract out services that were once produced within the household or firm;
3. Productivity growth is slower in the service sector than in agriculture or in industry.

[1] S.Kuznets first advanced this hypothesis.

These ideas gave rise to a series of empirical studies explaining a secular rise of the service-sector employment in advanced Western countries. Most of them are based on the Baumol's (1967) model of unbalanced growth. In this model, economy is composed of two sectors: one sector - the goods sector - has more rapid productivity growth than the other - the service sector - does[2]. With a number of rather standard assumptions (CRS production functions, iso-elastic consumption demand, perfect competition, closed economy), it is possible to derive an equation for the evolution of the service sector share of total employment (Inman, 1985):

$$\lambda_s = (\alpha - 1)\, r_g + (1 + \beta)\, (r_g - r_s) + \Delta\,, \qquad (1)$$

where $\lambda_s$ is the growth rate of the service sector share of total employment, $r_g$ and $r_s$ are the growth rates of labor productivity in the goods and service sectors, $\alpha$ is the income elasticity of demand for services, $\beta$ is the price elasticity of demand for services and $\Delta$ represents exogenous shifts in the demand for services over time.

The three terms of equation (1) can be interpreted as follows:

1. The *income effect*, $(\alpha-1)r_g$, reflects that rising income causes the service share to rise if $\alpha>1$, i.e. if services are luxury goods. In empirical applications income effect is usually modeled by including per capita GDP as a regressor.

2. The *differential productivity effect*, $(1+\beta)(r_g-r_s)$, measures the net impact of two offsetting effects. First, slower productivity growth on services causes the employment share of services to increase for a fixed output mix (so called labor requirements effect). Second, slower productivity growth on services causes the relative price of services to raise so that consumers substitute services for goods (substitution effect). The substitution effect will overpower the labor-requirements effect iff the demand for services is price elastic ($\beta<-1$). The differential productivity effect is modeled by including the ratio of price indices for services and for goods as a regressor. The assumptions of CRS and perfect competition imply equality between the ratio of sectoral output prices and the inverse of the ratio of sectoral productivities.

3. The *exogenous shifts* term, $\Delta$, represents all other factors that change the relative demand for services, holding constant income and relative prices. This term corresponds to Fuchs' second hypothesis. Possible exogenous factors include technological innovations, international trade, urbanization, expansion of welfare state, changes in female labor force participation and in outsourcing of support services, and other cultural and institutional factors.

Estimates made by Fuchs (1980) proved that distribution of total employment between agriculture, industry and services is closely related to the level of real GDP per capita. As real income rises, the agriculture share falls and the service share rises. The industry share rises to a peak at about $3,300 per capita (in 1970 US dollars) and then declines. Fuchs found that while the decline of agriculture was driven primarily by the differences in income elasticities of demand, the

[2] Baumol (1967) contrasted the service sector with manufacturing and used somewhat different notation.

shift from industry to services was in large part due to the lagging performance of labor productivity in the service sector.

Several later econometric estimations for advanced countries in the mid-1980s confirmed that the service share was not significantly affected by income changes, i.e. $\alpha \approx 1$. At the same time they concluded that demand for services was quite price inelastic, exogenous demand shifts played a secondary role and again the lagging productivity was the central cause of the service sector growth (Inman, 1985). However, the same models estimated with OECD cross-sections for the late 1990s derived the opposite conclusions: the income effect appeared to be the most important factor, cost-related variables were only slightly or not significant, among exogenous factors the female participation rate and the size of welfare state had strong positive effects (OECD, 2000). Changing elasticity of demand for services is partly explained by heterogeneity of services. Demand elasticities vary across service sub-sectors: as their income rises people are likely to consume more restaurants, air-line, and tourism services, but they are less likely to consume more city bus services. Thus, composition of services does matter. Summers (1985) using international cross-sections for 1970-75 estimates that housing, medical care, and personal services have income elasticities significantly greater than 1, while recreation and education, transportation and communications, and government services have income elasticities of 1 or less. In the sight of this reasoning recently obtained results are attributed to the expansion of the hi-tech sector that led to substantial changes in the composition of services. On the other hand, the gap between goods and services productivity has narrowed in the latest decades: capital-to-labor ratio in services has increased, more service activities formerly provided by the government are now being shifted to the private sector.

Opponents of international comparisons of consumption patterns and, therefore, of employment structures based on equation (1) and on the alike models often argue that such comparisons are not valid since tastes differ widely across the countries. The question whether tastes really differ that much to prohibit international comparisons gave rise to intensive discussion in literature on international economics. From the economist's standpoint the identity of tastes means that relative quantities purchased in different situations can be explained by differences in prices and incomes. Kravis (1984) runs several empirical tests on international data to prove the similarity of tastes in this sense and reports results that are supportive of the hypothesis that tastes do not vary significantly. In this paper the fixed effects is utilized to exclude the influence of country-specific preferences.

Ofer (1973) performed an extensive study of the service sector development in the USSR (though a bit outdated, it is still interesting both in methodology and findings). He estimated the service sector share in 1959 to be at about 60% of its ‘normal’ level. He also found that the gap was largest in trade, business services, and public administration, at the same time an ‘excessive’ proportion of labor was employed in education, science, and health. The low share of business- related services could be attributed to the fact that socialist enterprises were on average of larger size than their Western counterparts and, therefore, had less need to contract out production-related services. To test for this possibility Ofer performed an international comparison of occupational structures of different industrial sectors in several countries. This analysis proved that compared to market coun-

tries actual shortage of administrative, clerical and marketing services was observed in Soviet industry and agriculture as well. The service gaps are explained in Ofer's study by specific growth strategy (rapid development of heavy industries, the low level of urbanization, high labor force participation rates, small shares of GDP allocated to private consumption), centralized organization of wholesale supplies and high quality of labor engaged in services. Ideological factors, mainly Marx's idea of the unproductiveness of service activities, appeared to have only limited effect.

A later study by the World Bank group (Easterly *et al*., 1994) indicated that during 1970-80s Russia failed to converge to internationally expected norm for all three indicators considered in the paper, namely, employment, value added, and end use. Moreover, according to their estimates, the country shifted away from the 'norm' in trade, business, consumer services (excluding housing) and public services. Positive progress was recorded in transport where Russia initially was above the expected norm. This study is particularly interesting because the authors attempt to calculate the potential employment generation of services. For 1990 the simulation results showed that closing the service gap would create a total of 2.86 million extra jobs in Russia. However, this study did not give any answer about the likely time period for convergence and the likely sequence of convergence of different sub-sectors. In reality, during 1990-99 actual employment in services increased by 2.79 million of jobs. Does it mean that the convergence process is already over?

In spite of rapid pace of sectoral restructuring, examination of literature on transition economies reveals that there has been little analysis of labor reallocation across industrial sectors. Most theoretical and empirical models have been formulated in terms of ownership and follow standard Aghion-Blanchard framework (Aghion and Blanchard, 1994). These models generally ignore changes in industrial composition. Recently few studies made attempt to fill the gap. Jackman and Pauna (1997) investigate the extent of inter-industry labor reallocation in six CEE countries in 1989-94 and offer several simple measures of the magnitude of labor misallocation and of speed and efficiency of reallocation. They report that in 1989 the extent of labor misallocation was the largest in Romania (31.3% of the labor force was required to change sector enable the country to attain same structure of employment as in Southern European countries). The need for restructuring was also great in Bulgaria (24.2%), Poland (23.0%). Hungary, Czech and Slovak Republics were in better position, but still needed 17-18% of the labor force to be reallocated. Assessing the progress in restructuring by 1994, Jackman and Pauna conclude that imbalances remained as great as they were prior reforms, the situation even worsened in Bulgaria and Romania. In Poland and Hungary the gaps narrowed by 1-3%. Most notable improvement of employment structures was achieved in Czech and Slovak Republics. However, a significant part of observed structural changes does not indicate successful labor reallocation, rather it reflects differential job losses due to uneven incidence of macroeconomic recession across the sectors.

Sorm and Terrell (2000) study sectoral restructuring and labor mobility in the Czech Republic in 1989-98. According to their estimates, the major shifts occurred in the first half of the period. The largest decrease in employment was in the primary sector (agriculture, hunting and forestry), which was halved between 1989 and 1993 and reduced by an additional 29% between 1993 and 1998. Industry (manufacturing plus utilities) shed about one-fifth of its labor by 1993 and another 10% be-

tween 1993 and 1998. The fastest growing sectors were construction, wholesale and retail trade, hotels and restaurants, and financial services, which were relatively small under socialism. They also find that about one half of people who changed jobs changed the sector as well and that the unemployed and those out of labor force were more likely to change their sector of employment than job-to-job movers. Mickiewicz and Zalewska (2001) find that the impact of initial conditions on speed and efficiency of labor reallocation is often overestimated. They conclude that pre-reform level of per capita GDP does not determine the way a country transforms its employment structures, and that the speed of corporate governance reforms (proxied with the average of the EBRD enterprise reform indicators) is the main explanation.

The evidence whether transitional economies have closed the service gap remains controversial. For example, EBRD Transition Report (1999) states that by 1997 central Europe, the Baltic countries and western parts of CIS had virtually caught up with a 'normal' level of service employment calculated on the basis PPP GDP's of 41 countries. Gros and Suhrcke (2000) using the data on 130 countries report that most of transitional countries still face a problem with structural adjustment of employment, albeit output shares have already attained expected levels.

## 3. MEASURING THE SERVICE-SECTOR EMPLOYMENT

Before examining the hypotheses, it is worthwhile to discuss in detail measurement issues relating to definitions of the service sector employment. The most serious measurement problem comes from discrepancies in national industrial classifications. In different countries data on employment are drawn from variety of sources: labor force surveys, establishment censuses and surveys, social insurance records, and official national estimates. The concept of employment generally refers to people above a certain age who worked, or who held a job, during a reference period. Employment data include both full-time and part-time workers. There are, however, many divergences in how countries define and measure employment status, particularly for part-time workers, students, members of the armed forces, and contributing family workers.

For international comparisons the most comprehensive source is labor force surveys. Where data are obtained from establishment surveys, they cover only employees; thus, self-employed and family workers are excluded. In such cases the employment share of the agricultural sector and of certain service activities is underreported. The reference period of the census or survey is another important source of differences: in some countries data refer to people's status on the day of the census or survey or during a specific period before the inquiry date, while in others the data are recorded without reference to any period. In developing countries, where the household is often the basic unit of production and all members contribute to output, but some at low intensity or irregular intervals, the estimated labor force may be significantly smaller than the numbers actually working. Countries also take very different approaches to the treatment of unemployed people. In most countries unemployed people with previous job experience are classified according to their last job. But in some countries the unemployed and new entrants to the labor market are not classifiable by sector. As a

result, the size and distribution of employment by broad industrial sectors is not fully comparable across countries.

The ILO reports employment data by major divisions of the International Standard Industrial Classification (ISIC). It defines services to include wholesale and retail trade; restaurants and hotels; transport, storage, and communications; financing, insurance, real estate, business services; community, social, and personal services - corresponding to divisions 6–9 (ISIC revision 2) or tabulation categories G–P (ISIC revision 3). The major difference between these classifications is that the third revision gives much more detailed classification of services. However, some countries supply data according to national classifications where industry definitions and descriptions differ from the ISIC. The latter is true for Russia.

In Russia statistical bodies collect employment data under the OKONKh (All-Union Classification of Industries). The OKONKh classification was introduced in 1976 and has undergone 24 changes by 2001. However, these changes were of minor significance (all of them occurred within one-digit industrial categories), so they are not likely to cause errors in year-to-year comparisons. For example, before 1995 professional fire protection was included into community services (zhilishchno-kommunal'noe khozyaistvo), in 1995 it moved to the public administration category. Most considerable changes were undertaken in 2000, they reflected changes in the structure of public administration.

Official Goskomstat publications quote the estimates of sectoral distribution of employment combined from a number of sources, namely establishment surveys, labor force surveys (for the self-employed and workers at private farms), data from migration offices (for foreign labor force), and sampled surveys of informal employment (Goskomstat, 1996). The data follows the OKONKh classification, which is not similar to the ISIC. Therefore, the Goskomstat figures cannot be used for direct comparison with the data obtained from international sources. Table 2 shows the differences in the size of sector shares measured by both methods. Fig.1 provides some clues to the sources of these differences. First of all, the OKONKh covers only civilian labor force and excludes armed forces, militarized police, rescue services, and prison surveillance. Taken together these activities amount to about 3% of the labor force. Next, there are differences in the placement of some activities. Under the OKONKh steam and hot water supply and water works (collection, purification) and supply, gas distribution is treated as community services while under the ISIC-3 they are placed into industry (category E). On the other hand, repair of motor vehicles, personal and household goods, washing and dry cleaning of textiles and fur products, architectural services, production of personal goods to individual orders are put into industry in the OKONKh and into services in the ISIC. Industries labeled as "Other industries" in most of Goskomstat publications include variety of activities: centralized supply and renting of machinery and equipment; purveyance of agricultural products; computer-based data-processing; real estate activities; general market-supporting activities; geology, geodesy and meteorology and some other activities not elsewhere classified. This list demonstrates that this group cannot be just added to services because some of these activities should enter industry or agriculture, though it is true that most of these activities are services.

**Table 2.** Comparison of the ISIC and the OKONKh.

| Year | OKONKh | | | | | ISIC-3 | | | | Difference | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | I | S | Other | S+Other | | A | I | S | A | I | S | S+Other |
| 1990 | 13.2 | 42.3 | 41.4 | 3.1 | 44.5 | Official estimates | 14.2 | 40.2 | 45.6 | -1.0 | 2.1 | -4.2 | -1.1 |
| 1991 | 13.5 | 41.8 | 41.8 | 2.9 | 44.7 | | 14.5 | 39.8 | 45.7 | -1.0 | 2.0 | -3.9 | -1.0 |
| 1992 | 14.3 | 40.5 | 41.9 | 3.2 | 45.1 | | 15.7 | 38.8 | 45.5 | -1.4 | 1.7 | -3.6 | -0.4 |
| 1993 | 14.6 | 39.4 | 43.1 | 2.8 | 45.9 | | 15.8 | 38.0 | 46.1 | -1.2 | 1.4 | -3.0 | -0.2 |
| 1994 | 15.4 | 37.0 | 44.9 | 2.7 | 47.6 | | 16.4 | 35.9 | 47.7 | -1.0 | 1.1 | -2.8 | -0.1 |
| 1995 | 15.1 | 35.2 | 46.8 | 3.0 | 49.8 | | 16.1 | 34.0 | 50.0 | -1.0 | 1.2 | -3.2 | -0.2 |
| 1996 | 14.4 | 33.7 | 48.6 | 3.3 | 51.9 | | 15.3 | 32.5 | 52.2 | -0.9 | 1.2 | -3.6 | -0.3 |
| 1997 | 13.7 | 31.8 | 51.9 | 2.7 | 54.6 | | 14.4 | 30.9 | 54.7 | -0.7 | 0.9 | -2.8 | -0.1 |
| | | | | | | LF surveys | 12.2 | 30.0 | 57.8 | 1.5 | 1.8 | -5.9 | -3.2 |
| 1998 | 14.1 | 30.1 | 53.1 | 2.7 | 55.8 | | 11.5 | 29.4 | 59.1 | 2.6 | 0.7 | -6.0 | -3.3 |
| 1999 | 13.7 | 30.3 | 53.1 | 2.9 | 56.0 | | 11.8 | 29.4 | 58.8 | 1.9 | 0.9 | -5.7 | -2.8 |
| 2000 | 13.4 | 30.4 | 53.1 | 3.2 | 56.2 | | 12.2 | 30.0 | 57.8 | 1.5 | 1.8 | -5.9 | -3.2 |

*Note*: A = Agriculture, I = Industry, S = Services.

*Sources*: OKONKh - GOSKOMSTAT (2001), ISIC – LABORSTA Database (http://laborsta.ilo.org).

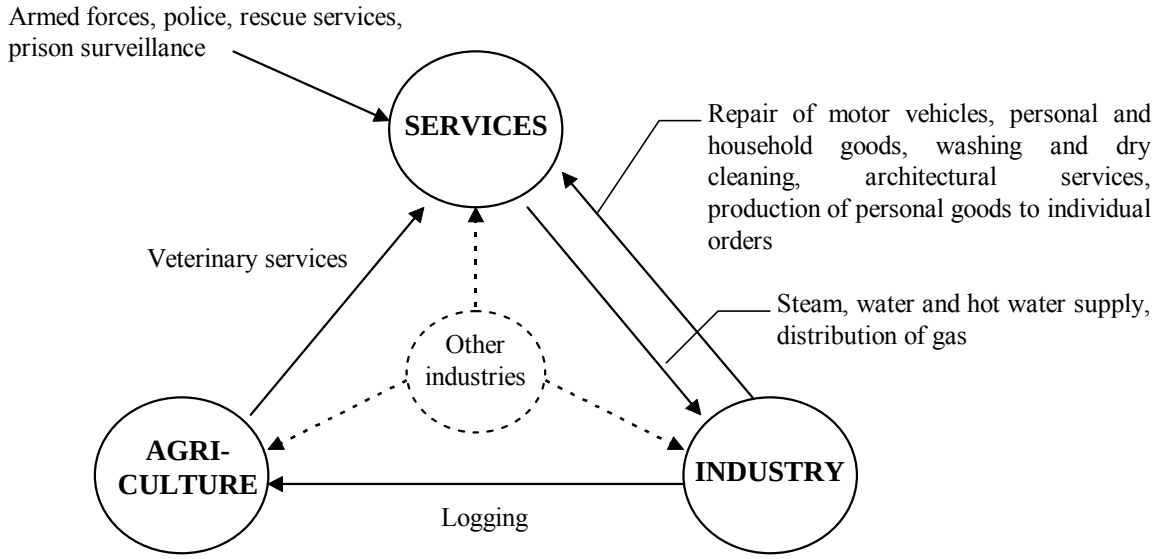


**Fig.1.** Comparison of the ISIC and the OKONKh.

The results of labor force surveys are quoted in accordance with the OKDP classification (All-Russia classification of economic activities), which is nearly identical to the ISIC-3. Thus, estimates based on labor force surveys can be directly used for international comparisons.

## 4. MACROECONOMICS OF THE SERVICE SECTOR GROWTH

This section introduces and discusses some measures of change in employment structure required prior the transition (called 'service gaps'), estimates the long run share of the service sector, documents and explains recent trends in the service employment in sectoral decomposition.

### 4.1. The overall service gaps

**Model specification.** In measuring the service gap in Russia I followed the comparative approach employed in Fuchs (1980), Ofer (1973), Easterly *et al*. (1994). The intention was to construct counterfactual estimates of what the service sector share of total employment would have been if Russia had been a market economy in the late 1980s. The strategy utilizes Fuchs' findings that the models estimated separately for the USA and other OECD countries did not differ much in coefficients, implying that the share of the service sector has been generally uniform since the 1970s and becomes even more so in all advanced market economies. It is assumed that Russia would have tracked this convergence tendency if market forces had not been suppressed by the state.

Theoretically, there are two possible ways to relate the service sector growth to the level of economic development. The first approach is to use the unique index of economic development, e.g. per capita GDP, or a weighted average (with agreed-upon fixed weights) of several development indicators. If per capita GDP is used, this approach exploits the first of Fuchs' hypotheses. The second approach is to consider a combination of development indicators and to allow each of them to have its own effect on industrial structure. The latter approach seems to fit better the specific situation in the USSR and in post-communist Russia but for different reasons. As Ofer (1973) reported the USSR in the early 1960s was less urbanized and employed a higher percentage of population than other countries with the same level of per capita GDP and was less developed in this sense. Hence, adding other development indicators (urbanization and LFP rates) reduced the expected share of services in total employment. On the other hand, over the 1990s low per capita GDP in Russia matched the level of industrial complexity and human capital development comparable with those in most advanced economies. Under these conditions, one should anticipate that inclusion of other development variables would raise the expected service share.

Instead of committing myself to either approach, I computed two alternative measures of the service sector gap: one - based on per capita GDP alone and another - based on combination of GDP and some other development variables. In the light of the first approach, the computations of expected sector shares employed the set of equation first introduced in Fuchs (1980):

$$\textit{Agriculture: } A = e^{\beta(GDP^{\alpha})} \quad \textit{or} \quad \ln A = \beta(GDP^{\alpha}) \tag{2}$$

$$\textit{Services: } S = 100 - e^{\delta(GDP^{\gamma})} \quad \textit{or} \quad \ln (100-S) = \delta(GDP^{\gamma}) \tag{3}$$

where GDP denotes GDP per capita in comparable units.

In accordance with the second approach, besides per capita GDP, the set of explanatory variables included the ratio of labor productivities in the goods and service sectors, the female labor force participation rate (LFP) rate, the proportion of urban population, demographic composition, and foreign trade patterns[3].

The ratio of labor productivities in the goods (agriculture + industry) and service sectors was included to capture sectoral differences in labor efficiency across countries. As a productivity indicator I used per worker value added produced in the relevant sector measured in current US dollars. This variable enables to test the third Fuchs' hypothesis. If services lag in productivity growth than the coefficient of the productivity ratio should be positive.

The remaining variables correspond to the exogenous shift term in equation (1). Inclusion of the female LFP rate into regressions is justified by the fact that many of domestic and personal services (e.g. child care, cleaning, cooking, etc.) can be either produced at home or bought from the market. Non-working women are widely engaged in home production, while working women devote less time to work at home and are more likely to buy such services outside the household. I expect higher female rates to result in higher service shares. However, this explanatory variable is likely to be endogenous. Jobs in services often offer more flexible working arrangements (e.g. part-time, work at home) than jobs in industry and agriculture. Women with young children may choose to enter the labor force and take jobs in services, while jobs in industry and agriculture are not attractive for them. Additionally, many service jobs-such as nursing, social and clerical work are considered "feminine" because of a perceived similarity to women's traditional roles. Women often do not need to receive training to take advantage of employment opportunities in the service sector. Thus, higher service shares ‘promotes’ higher LFP rates among women.

The rationale for considering the urbanization rate is as follows. First, the city life itself demands for more services. Second, the higher level of specialization of production in cities makes firms to contract out more services instead of providing them for themselves. Third, due to territorial concentration production of services to urban population is much more efficient. The first two factors unambiguously increase the service share. The third factor works in two opposite directions. Lower prices for services in cities increase demand for them and, hence, the labor input into services (substitution effect). At the same time, higher productivity of labor in urban services reduces the labor input needed per unit of service (labor-requirements effect). I predict that labor requirements effect is relatively small in comparison with positive effects and the net impact of urbanization is significantly positive.

Given very different demographic compositions in the considered countries and systematic association of age structures with development, I incorporate explicitly into the analysis two demographic variables: the proportions of population under 15 and over 65. Children are relatively service-

[3] Due to lack of the data the relative cost of services is not included into the model, therefore, the effect of the development variables may be overstated since there is a solid evidence that service prices are higher relative to goods prices in rich countries than in poor ones (e.g. Bhagwati, 1984; Kravis, 1982; Falvey and Gemmell, 1991).

intensive due to schooling, childcare, and so forth. The elderly demand for more medical care, personal services, etc. Both variables are expected to have positive impact on overall service shares.

**Data and estimation results.** Since neither country can serve a perfect benchmark for Russia in terms of economic development, climate resemblance, population size and density, I employ the data from the World Bank Development Indicators Database (WDI, 2001 edition). This data set covers 207 countries for the period from 1940 to 1999. Data on sector shares are quoted only for 1980-1998. Values of per capita GDP are PPP corrected and reported in current international dollars, these data are available from 1974. Data on LFP rates and sector shares follow the ILO definitions. Some of missing observations of the service sector employment as well as observations for earlier years were replaced with numbers from the LABORSTA database and the ILO's "Total and Economically Active Population: Estimates and Projections, 1950-2010" Database. Descriptive statistics for selected years given in Table A1 in Appendix demonstrate an unambiguous global trend for the expansion of the service sector employment since the middle of the past century. The data used in regressions covers the period from 1974 to 1999.

Table 3 presents the results of estimation of Fuch's equations (2)-(3) for 1990. The year of 1990 was chosen because for many transitional countries it was the last pre-reform year or the first year of reforms and because of data conveniences. The coefficients were estimated with a sub-sample of 118 market economies (i.e. non-socialist countries), estimates of sector shares for then-socialist countries were then obtained through out-of-sample predictions. Signs and values of all coefficients correspond to those in Fuchs (1980).

Three rightmost columns of Table 3 show the estimated and actual sector shares in 1990, and the difference between the two. According to the estimates, in 1990 actual Russian service share was at 78% of its expected value. In order to compare Russia with other transitional countries I calculated the percentage deviations of actual service shares from estimated by equation (3) (see Table A2 in Appendix). Along with most of CEE and CIS countries Russia falls in a group of countries with largest service gaps. From the former socialist block the largest gap in 1990 was experienced by China and Romania. The ranking of CEE countries is similar to that reported in Jackman and Pauna (1997), except for Slovakia.

**Table 3.** Sector shares regressions, Fuchs approach (Russia).

| 1990 | | Coeff. | t-stat. | $R^2$ | Estimated share | Actual share | Deviation |
|---|---|---|---|---|---|---|---|
| Agriculture | $\alpha$ | -.292 | -14.975 | 0.66 | 9.2 | 13.9 | +4.7 |
| | $\beta$ | 32.724 | 6.274 | | | | |
| Services | $\delta$ | -.069 | -16.342 | 0.70 | 58.8 | 45.9 | -12.9 |
| | $\gamma$ | 7.023 | 28.844 | | | | |
| Industry | | | | | 32.0 | 40.2 | +8.2 |

Controlled for per capita incomes, the share of services in Slovakia, as well as in Azerbaijan, Kyrgyzstan, and Croatia, equals to the international 'norm'. Mongolia is a clear outlier, it represents a peculiar case of very large positive deviation. In my opinion, this peculiarity should not be attributed to prosperity of services in Mongolia, but rather to low level of GDP (The possibility of measurement errors of both dependent and independent variables also cannot be ruled out). Another caution about interpretation of results in Table A2 concerns small economies that are dominant in the group with largest positive deviations. They may specialize in certain types of production and thus have very disproportional industrial structures. Further study is needed to investigate the relationship of foreign trade patterns and national industrial structures.

Fuchs' approach has at least one practical disadvantage. Its estimates are extremely sensitive to changes and measurement errors in per capita GDP, especially at low- and middle income levels. The sensitivity comes from two major sources. First, the method relies on a single indicator and, though rapid changes in national GDPs are quite probable, employment structures seem to be rather conservative and slow changing. Second, the computations use cross-sections, therefore, the estimates of long-run service shares may be subject to business cycle movements and national demand shocks.

**Table 4.** Pooled OLS and fixed effects models for the overall service share.

| Independent variables | Pooled OLS | | Fixed-effects | |
|---|---|---|---|---|
| | Coeff. | t | Coeff. | t |
| Log GDP | 4.448 | 8.563 | 1.480 | 2.620 |
| Female LFP | -0.032 | -1.010 | 0.055 | 0.673 |
| Log productivity ratio | 8.861 | 13.508 | 7.501 | 13.885 |
| Urbanization | 0.314 | 20.628 | 0.350 | 8.606 |
| Age 0-14 | 0.370 | 5.291 | -0.126 | -1.113 |
| Age 65+ | 0.748 | 7.275 | 1.642 | 8.431 |
| LF survey | 5.267 | 9.584 | 3.334 | 7.845 |
| Socialist | -9.946 | -11.548 | -4.829 | -6.843 |
| Constant | -65.577 | -10.210 | -31.500 | -3.934 |
| | $R^2 = 0.7332$<br>F(15, 1825) = 547.84<br>Prob>F = 0.0000 | | $R^2$: within=0.6201 F(9, 936)=169.72<br>between=0.7352 Prob>F =0.0000<br>overall=0.6997 | |

*Note*: OLS standard errors adjusted for heteroskedasticity. OLS regression also controls for survey coverage and missing values in all variables except dummy variables.

The alternative approach based on the combination of several development indicators allows overcoming these difficulties and specifying more realistic and stable models for the long-run service share. In addition, this method exploits panel structure of the WDI data.

The estimation results for the pooled OLS and fixed effects models are reported in Table 4. Conceptually, the fixed effects specification is more favorable for international panels. It assumes that each country in a sample is unique and cannot be viewed as a random draw from some underlying population. Thus, it isolates the role of preferences. For the purpose of this study, such reasoning is even more appropriate since the ultimate goal is to make predictions for one particular country. The random effects specification is not considered because its assumptions of random and time-varying individual effects evidently do not hold in this case. In general, the OLS estimates have more significant coefficients than panel estimates since most of variation is across countries rather than time. However, they may be biased in the absence of control for country-specific preferences. That is why discussion below is based on the fixed effects estimates if the OLS estimates are not referred explicitly.

**Table 5.** Effects of socialism.

| Independent variables | Pooled OLS | | Fixed-effects OLS regression | |
|---|---|---|---|---|
| | Coeff. | t | Coeff. | t |
| Log GDP | 4.681 | 9.071 | 3.119 | 5.599 |
| Female LFP | -0.012 | -0.382 | -0.040 | -0.519 |
| Log productivity ratio | 9.366 | 13.592 | 8.949 | 16.952 |
| Urbanization | 0.317 | 20.724 | 0.313 | 8.207 |
| Age 0-14 | 0.349 | 4.909 | -0.138 | -1.295 |
| Age 65+ | 0.692 | 6.730 | 1.322 | 7.113 |
| Private consumption | 0.069 | 2.722 | 0.190 | 8.602 |
| LF survey | 5.162 | 9.412 | 2.955 | 7.276 |
| Socialist | 2.911 | 0.732 | 62.834 | 3.384 |
| Interactions: | | | | |
| Socialist*Log GDP | -0.343 | -1.603 | 0.741 | 0.420 |
| Socialist*Female LFP | -0.198 | -2.414 | -0.330 | -2.076 |
| Socialist*Log prod. ratio | 0.528 | 1.544 | -3.268 | -1.863 |
| Socialist*Urbanization | -0.034 | -0.700 | -0.252 | -2.622 |
| Socialist*Priv.consumption | -0.050 | -1.631 | -0.537 | -4.909 |
| Constant | -73.658 | -11.055 | -54.783 | -7.013 |
| | $R^2$ = 0.7363<br>F(22, 1818)=387.66<br>Prob > F = 0.0000 | | $R^2$: within=0.6764 F(15,924)=128.78<br>between=0.7536 Prob>F =0.0000<br>overall=0.7305 | |

*Note*: OLS standard errors adjusted for heteroskedasticity. OLS regression also controls for survey coverage and missing values in all variables except dummy variables.

In Table 4 all coefficients but that of the share of children in total population have expected sings. The results are in accord with Fuchs' hypotheses that services are income elastic and lag in productivity: the productivity effect dominates over the income effect. Children do not appear to be service-intensive: the corresponding coefficient is negative (though not significant). On the contrary, old people are service-intensive; a higher proportion of the elderly increases service employment. Urban areas use more services than rural ones. The insignificance of coefficient of the female LFP rate can be attributed to extensive use of female labor in private agriculture in less developed countries. Controls for the source and quality of data appeared to be helpful. Labor force surveys tend to give higher estimates of service employment (on average by 3.3%) than official sources. Table 4 also contains a dummy variable for 'being a socialist country'[4]. The coefficient of this dummy variable indicates that the socialist service shares at comparable levels of economic development were lower than in market economies by at least 4.8%. However, this likely to be a lower bound of the service gap, the real gap is larger because under the fixed effects assumptions it is impossible to make a proper distinction between under country-specific and socialism-specific factors in individual time-invariant components. The OLS estimate – 9.9% – gives an upper bound of the socialist impact[5].

Table 5 interacts the effects of the socialism system and the growth forces of the economy. It allows drawing crude conclusions about the relative influence of ideological considerations and economic forces. The positive coefficient of the socialist dummy (main effect), in my opinion, supports the hypothesis that at least in the 1970-1980s purely ideological factors played a very small role. The OLS model suggests even stronger conclusion that the socialism system itself favored development of services. At the same time socialist system impeded the expansion of services through the negative effect on major growth indicators: female LFP, goods/services labor productivity ratio, urbanization, and private consumption. However, most of these effects are not strongly significant in both specifications.

Next, I estimated the long-run trajectory for the Russian service employment share with different sets of explanatory variables. The procedure was carried out as follows. First, I estimated the fixed effects model for all countries by running an equation similar to one reported in Table 4. Its coefficients and fixed effects were used to compute the fitted values of the service sector shares for both market and socialist economies. Then, in order to correct for the distortions of socialism I deducted the product of socialist dummy and its coefficient. For market economies this operation had no ef-

[4] Cuba, Mongolia, and Democratic People's Republic of Korea are labeled 'socialist' through the whole sample. For other countries (Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Belarus, Estonia, Georgia, Croatia, Kyrgyzstan, Kazakhstan, Lithuania, Latvia, Moldova, Macedonia, Russian Federation, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Yugoslavia) the first year of market economy is the year of country's accession to the IMF. For Poland, Hungary, and China the year of 1990 is taken as the first year of market economy and 1991 - for Czech and Slovak republics. Viet Nam is labeled socialist during 1975-1990.

[5] Table A4 in Appendix sums up the effects of foreign trade. If country-specific preferences and circumstances are controlled, higher shares of agricultural exports and imports hamper service employment, while higher manufactures imports encourage its growth. Therefore, specialization of small countries in certain activities, mainly in agriculture, may affect the share of service employment. Inclusion of foreign trade variable did not affect much coefficients of the variables reported in Table 4: it had significantly positive effect only on the log productivity ratio.

**Table 6.** Estimated long-run shares of service employment.

| Year | Actual share | GDP | | | GDP, urban, female LFP, productivity ratio, demography | | |
|---|---|---|---|---|---|---|---|
| | | OLS | FE | Δ FE | OLS | FE | Δ FE |
| 1990 | 45.6 | 53.7 | 52.6 | -7.0 | 61.6 | 51.0 | -5.4 |
| 1991 | 45.7 | 53.3 | 52.3 | -6.6 | 60.5 | 50.8 | -5.1 |
| 1992 | 45.5 | 52.5 | 51.6 | -6.1 | 54.9 | 47.5 | -2.0 |
| 1993 | 46.1 | 51.4 | 50.8 | -4.7 | 56.2 | 49.2 | -3.1 |
| 1994 | 47.7 | 50.0 | 49.7 | -2.0 | 55.9 | 49.7 | -2.0 |
| 1995 | 50.0 | 49.9 | 49.6 | 0.4 | 56.5 | 50.8 | -0.8 |
| 1996 | 52.2 | 49.6 | 49.4 | 2.8 | 56.8 | 51.2 | 1.0 |
| 1997 | 57.8 | 55.9 | 54.0 | 3.8 | 61.4 | 55.2 | 2.6 |
| 1998 | 59.1 | 55.4 | 53.7 | 5.4 | 61.9 | 55.8 | 3.3 |
| 1999 | 58.8 | 56.3 | 54.4 | 4.4 | 63.1 | 56.9 | 1.9 |

*Note*: FE = Fixed Effects

fect since the value of the socialist dummy is nil. For socialist economies it resulted in the rise of the expected value since the coefficient of the socialist is negative. The results for Russia are shown in Table 6 (OLS predictions are reported for comparison). The gap is the largest if calculated on the basis of GDP per capita alone. Against the expectations, adding more development variables to the analysis did not broaden the gap. The urbanization level and demographic structure has been less sensitive to transitional shock, which caused sharp decline in GDP and productivity in the goods sector. Summarizing the estimates, in 1990 the service share was expected to be at about 51-53% of total employment, i.e. the gap equaled to ≈ 6%. The table also provides an evidence of intensive catching-up process in 1990-96: on average, the overall service gap was eliminated in pace of first years transition and the service share reached its long-run equilibrium level. However, part of this 'progress' benefited from the lowering of the target level. In 1997-99 signs of overshooting in the development of the service sector become apparent.

Sectoral reallocation can be well explained appealing to the standard general equilibrium model of markets illustrated in Fig.2. Price liberalization and displacement of central planning as the system for reallocation of resources enhanced competitive environment and produced proper incentives for profit maximization. Price liberalization and emergence of private firms meant the move from point S under central planning to point M after price liberalization. At the same time macroeconomic instability, lack of market institutions, disorganization, etc. shifted the production possibilities frontier inducing the move to point E with lower demand for services. Thus, in transition supply side factors led to the increase of the service employment share while the demand side factors acted in opposite direction, but the latter effect was not strong enough to outperform the supply side effect. The inter-

action between these two effects solves the transition paradox of increasing service employment and simultaneous fall in GDP.

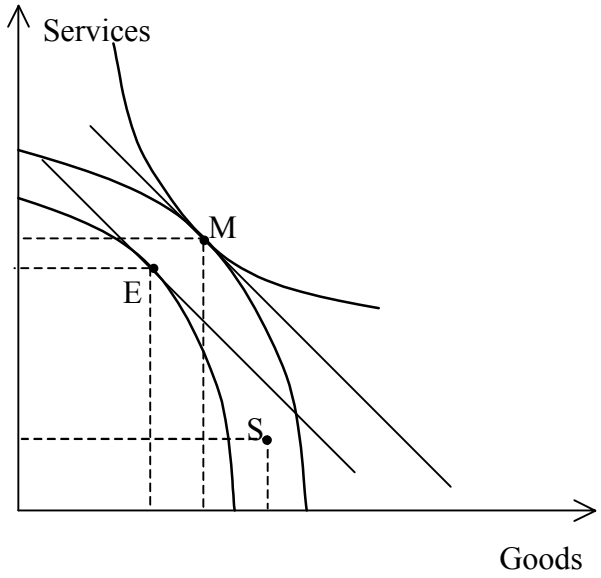


**Fig.2.** Sectoral reallocation during transition

Before proceeding, additional technical remarks are needed which potentially may affect the accuracy of results. Our panel is incomplete: there are no continuous time-series of all indicators for each country. From the total of 207 countries only 152 provide at least one full record, i.e. data on all dependent and independent variables over the period 1980-99. The others were excluded from the sample. From the rest some countries provide full record only for 1 year, while others have records for all years under consideration. The average for the sample is 9.9 years. Furthermore, the observations are not missing at random: low-income countries and those transitional countries, which appeared as a result of political disintegration and dismantling of empires, are more likely to suffer from non-reporting. This problem causes a danger of selection bias since indicators are incompletely observed for endogenous reasons. A ‘simple’ solution to discard from the panel any country, which has incomplete information, and use the balanced sub-panel only will not work in this case. Most information will be ‘thrown out’ leaving us with biased estimators and misleading tests.

To control for potential selection bias I estimated service share equations separately for each income group to learn whether countries adhere to the same rules at different per capita income levels and compare transition economies with countries at similar levels of development. One difficulty in identifying which countries are 'at similar levels of development' is that while the transition economies started out clustered in the upper-middle income group, ten years later they are found widely spread over income groups. By 1999 very few remained in the same category. In other words, the comparator countries change drastically over these ten years. According to (WDI, 2001), in 1990 Portugal and Greece were the countries with approximately the same GDP per capita as Russia. In 1998 Russia ranks between Brazil and Malaysia. In this paper the definition of income groups and the placement of each country to a specific group are taken from the World Bank Classification

(WDI, 2001)[6]. Group ascription is fixed as it was in 1998 and is not allowed to change over time. According to this classification Russia falls into the lower-middle income group. Most of the former Soviet Union countries end this period as low income or lower-middle income, while the majority of the CEE and Baltic countries in the late 1990s are classified as upper-middle income economies. Among ex-Communist countries the only one - Slovenia - is in the high income group, two other European countries – Ukraine and Moldova – are in the low income group.

Estimation results for the specific income groups are given in Table A5. They show that low- and high-income countries really adhere to different rules. The urbanization rate is significantly positive for all equations and its coefficient tend to grow with the rise of incomes. Productivity ratios are significant and positive in most specifications outlining the importance of productivity control. The elderly are service-intensive in all groups, but significantly so only in low and high income countries. Children are rather goods- than service intensive: for most income groups the relevant coefficient is significantly negative; only in the richest countries higher proportion of children increases service employment. The effect of increase in the female LFP rates is insignificantly positive or even negative, which is counter-intuitive and hard to explain. Differences in data sources may cause substantial biases in international comparisons. More specifically, labor force surveys on average report higher numbers of employed in services except for high income countries where official estimates and LF surveys are of roughly the same quality.

**Table 7.** Russian long-run service shares.

| Year | Actual share | Lower middle income | | | | Upper middle income | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | GDP | | Set of regressors*) | | GDP | | Set of regressors | |
| | | FE | OLS | FE | OLS | FE | OLS | FE | OLS |
| 1990 | 45.6 | 50.3 | 52.7 | 50.0 | 71.2 | 52.7 | 54.7 | 48.9 | 64.0 |
| 1991 | 45.7 | 50.1 | 52.3 | 49.9 | 70.3 | 52.4 | 54.5 | 49.2 | 64.6 |
| 1992 | 45.5 | 49.7 | 51.7 | 47.3 | 63.4 | 51.9 | 54.0 | 46.7 | 63.6 |
| 1993 | 46.1 | 49.2 | 50.8 | 48.7 | 65.8 | 51.1 | 53.3 | 48.9 | 64.7 |
| 1994 | 47.7 | 48.5 | 49.6 | 49.2 | 66.1 | 50.2 | 52.4 | 50.1 | 65.2 |
| 1995 | 50.0 | 48.4 | 49.5 | 50.0 | 67.2 | 50.1 | 52.4 | 51.4 | 66.4 |
| 1996 | 52.2 | 48.3 | 49.3 | 50.7 | 67.8 | 50.0 | 52.2 | 52.3 | 66.1 |
| 1997 | 57.8 | 56.2 | 54.0 | 55.3 | 68.8 | 54.6 | 58.0 | 56.5 | 70.2 |
| 1998 | 59.1 | 56.0 | 53.6 | 56.1 | 69.7 | 54.3 | 57.7 | 57.7 | 70.0 |
| 1999 | 58.8 | 56.5 | 54.3 | 57.1 | 71.3 | 54.9 | 58.2 | 58.7 | 70.4 |

*Notes*: *)Set of regressors includes log GDP per capita, urbanization rate, female LFP rate, log productivity ratio, demographic variables, and source controls

[6] The World Bank ranks countries by their level of economic development, using as criterion GNP per capita (exchange rates conversion). For 1998 the groups are: low-income, $760 or less; lower-middle-income, $761-$3,030; upper-middle-income, $3,031-$9,630; and high-income: $9,361 or more (World Bank, *1999/2*000 *World Development Report*, p. 291).

For low-income countries the urbanization rate, uneven productivity growth and the share of the elderly in population appears to be the most important determinants. For high-income countries GDP per capita, productivity ratio, urbanization rate, and demographic structure is significant. In the middle income group service employment is income inelastic; labor productivity, level of urbanization, and the share of children has major impact. The lowest row in Table A5 confirms that there is a selection bias in equation that pools all income groups, since the low-income group suffers from serious non-reporting. Thus, coefficients in such equation are biased towards those for the high income group.

The estimates of the long-run trajectory of the Russian service sector employment presented in Table 6 may be inaccurate since countries with higher per capita incomes dominate the sample. Table 7 provides the estimates based on sub-samples of middle income countries. Upper middle countries turn to be a better reference group for Russia than lower middle income group alone. In my opinion, Russia was misplaced to lower middle income group because conversion of GNP for classification purposes employed current exchange rates (see footnote 6 on page 20), but not PPP conversion factors. By the PPP corrected GDP per capita criterion Russia should be classified as an upper middle income country. In spite of the differences in coefficient structures of the underlying equations, estimates of Russian long-run service shares given in Table 7 for upper middle income group do not differ much from those in Table 6. The most notable improvement is the reduced dispersion of estimates obtained with different sets of explanatory variables. For 1990 the estimates are clustered at 50% of total employment, with the overall service gap at the beginning of transition equals to 5-6%.

Finally, I compared development of the Russian service sector with its progress in other transitional countries. Table A6 presents internationally expected service employment shares for several Central European countries and for China. By 1998-99 clear overshooting occurred in Estonia, Latvia, and Bulgaria. Considerable underdevelopment has not been overpassed in Croatia and China. Other countries approached close to the norm. Thus, some tentative conclusions may be drawn. Countries with successful transition process experienced relatively slow expansion of services. Though most of countries with troubled transition process (e.g. Bulgaria, Russia) achieved impressive results in the development of services, the case of Romania shows that transitional crisis can well cause the downsizing of the service sector.

### 4.2. Gaps for specific service sub-sectors

The results of the similar analysis at the level of specific service sub-sectors. The data used are from the ILO's LABORSTA Database. The sample contains the data on sectoral structure of total employment in 99 countries over the period from 1969 to 2000. Initial data were in numbers of employed and followed the ISIC-2, for early years, or the ISIC-3, for later years, definition. Extensive comments allowed adjusting the data to comparable forms. The data were collected through either of four sources: population census, labor force survey, labor-related establishment survey and official estimates. For some of countries several sources for the same years were available, in this case labor force surveys were preferred to official estimates. For both the OECD and non-OECD coun-

tries missing observations were quite common. Values of explanatory variables were taken from WDI Database (2001).

When estimating employment-share models for each service sub-sector two alternative sets of regressors were considered. The first set consists of the variables that were included in the equation for the overall service share: the log of GDP per capita, the female LFP rate, the productivity ratio, the urbanization rate, demographic variables, and source controls. The second set of explanatory variables included regressors that are likely to be especially relevant to for specific service activity. Table 8 provides names of sub-sectors used in analysis (they correspondent to ISIC-2 divisions) and lists of specific explanatory variables for each service sub-sector. The dependent variable in all equations is the share of the given sub-sector in total employment.

Table A7 presents estimation results for separate regression models explaining employment shares of each of the four service sub-sectors with a common set of explanatory variables. The four sub-sectors differ in terms of signs, magnitude and statistical significance of the estimated coefficients, confirming that it is important to differentiate among service sub-sectors when analyzing the determinants of employment shares. The fit of the model also varies across the four sub-sectors suggesting that the conclusions derived from the model for the overall service share may be somewhat misleading. In fact, each service sub-sector is driven by specific forces and using the same explanatory variables for each sub-sector fails to fully reflect the differences in underlying determinants.

**Table 8.** Classification of service sub-sectors.

| Short Name | Divisions (ISIC2) | Tabulation categories (ISIC-3) | Independent variables |
|---|---|---|---|
| Trade | 6 - Wholesale and retail trade and restaurants and hotels | G: Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods + H: Hotels and restaurants | GDP per capita, female LFP, productivity ratio, urbanization rate, demography controls, source controls, household final consumption (% of GDP), exports (% of GDP) |
| Transport | 7 - Transport, storage and communication | I: Transport, storage and communications | GDP per capita, productivity ratio, urbanization rate, population density, source controls, value added in industry (% of GDP), value added in agriculture (% of GDP) |
| Business services | 8 - Financing, insurance, real estate and business services | J: Financial intermediation + K: Real estate, renting and business activities | GDP per capita, productivity ratio, urbanization rate; foreign direct investment (net inflows, % of GDP), source controls, value added in industry (% of GDP), value added in agriculture (% of GDP) |
| Social services | 9 - Community, social and personal services + 0 - Activities not adequately defined | L: Public administration and defense; compulsory social security + M: Education + N: Health and social work + O: Other community, social and personal service activities + P: Private households with employed persons + Q: Extra-territorial organizations and bodies + X: Activities not elsewhere classified | GDP per capita, productivity ratio, urbanization rate, government final consumption expenditures (% of GDP), female LFP, proportion of population under 15 and over 65, source controls |

Under the fixed effects assumption the logarithm of per capita GDP has a positive effect for transport and business services. Strong positive relationship for business and transport services is likely to reflect greater intermediate demand for such services in more developed countries. The sign of log GDP for trade and social services is negative in the fixed effects model but not significantly so. Absence of strong positive relationship between higher income and higher employment share for social services is surprising. This may be due to intensive regulation of social services many of which are publicly provided or due to multicollinearity problem caused by high correlation of independent variables.

A higher urbanization rate increases the share of trade, transport and social services, but has insignificant effect on business services. Urban population demands for more trading services than farmers since less products are produced within households. Similarly, demand for public transportation is greater among city inhabitants. Urban occupations also require more education than predominantly rural occupations while education comprises about one-fourth of social services. In this connection, self-selection comes into work; people with higher demand for schooling migrate to cities.

Higher productivity ratio increases the share of trade and social services and has no effect on transportation and business services. Higher female LFP reduces the share of transportation, but enhances the shares of trade, business and social services. Positive association between higher female LFP and higher employment share in trade activities is consistent with substitution of home production of some goods and services for buying them at the market. Also trade services offer most flexible working schedules and are less skill-sensitive attracting women with low education or with long periods of inactivity. Actually, women comprise a large proportion of workers in this subsector.

Higher share of children in total population reduces employment in trade and transportation, but has strong positive effect on business services and no significant influence on social services. This proves the above derived conclusion that children are more goods- than service-intensive; however, children also demand for greater amount of social services. Higher share of the elderly increases employment in trade, social (most probably due to health and public administration of pension schemes) and business services (due to financial and insurance operations).

Tables A8-A11 provide estimation results for employment-share models with sub-sector-specific sets of regressors. Regression for the share of the trade sub-sector does not have much explanatory power in the fixed effects model (overall $R^2$=0.29). Trade employment is income inelastic and is not responsive to the involvement into international trade (measured as ratio of exports to GDP). The share of employed in trade activities on average is higher in countries with higher shares of GDP devoted to final consumption of households, higher relative productivity in the goods sector and higher level of urbanization. Demographic structure has little influence on the share of trade employment that may be explained by lower purchasing power of these groups of population in comparison with the prime age group. The coefficient of the socialist dummy indicates that 'being a socialist country' reduces the share of trade employment by 1.1%.

Positive coefficient of the productivity ratio for transport and communications suggests low labor productivity in this sector. Higher population density encourages higher employment in this sub-sector. An increase of industrial and agricultural production suppresses the growth of employment in transportation. Larger industrial and agricultural enterprises may prefer to have own transportation departments rather than outsource these services.

The results for business services show that growth of foreign direct investment increase the employment share. This finding is consistent with the fact that modern commercial practices and organization structures introduced by foreign companies tend to focus on main operations and contract out more of complimentary service activities. For reasons mentioned above for transportation shares of value added produced in industry and agriculture have negative impact on business services as well.

Social services are a particularly heterogeneous sub-sector in the ISIC-2 definition and include a great deal of activities for which market forces are suppressed by government direct management and regulation. Alongside the positive association with productivity ratio, female LFP and urbanization rate employment in social services is positively related to population shares of children and old people. The impact of welfare state measured by government final consumption expenditures is positive and significant in the OLS model. The negativity of the socialist dummy shows that in spite of welfare rhetoric, socialist countries on average employed fewer workers in social services than market economies at same levels of economic development.

Table 9 presents the estimates of ‘normal’ shares for the considered service sub-sectors for Russia and the differences between actual and expecteded shares. The estimates use official sources of data for 1990-96 and LF surveys since 1997. Differences in predictions between the OLS and fixed effects specifications are sizeable. Though predictions for the overall service share implied that by 1996 the gap was eliminated, estimates of the gaps for specific service sub-sectors suggest that *restructuring within the service sector* itself remains a task for coming years.

Trade services are still undeveloped by international standards, however, the gap has been narrowing during the last decade. Transport services were already above the norm in the beginning of reforms and showed no signs to converge to the norm during transition. In a certain sense it is normal for Russia to have ‘excessive’ employment in transportation due to the large territory and to concentration of natural resources in the eastern parts of the country while major consumers of these resources are located in European parts of the country and abroad.

An interesting finding is that the share of business services was closer the norm in 1990 and has been declining during transition. This dynamics masks two opposite tendencies within business services: rapid decrease of employment in R&D and related activities and booming rise of employment in finance, banking, and real estate. The data in hand do not allow separating 'classic' business services from R&D. The combination of low share of business services and high share of social services yields a hypothesis that much of business services are actually rendered by establishments placed into the social services category.

**Table 9.** Deviations for specific service shares.

| Year | Trade | | | Transport | | | Business services | | | Social services | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Act. share | Estimated share | | Act. share | Estimated share | | Act. share | Estimated share | | Act. share | Estimated share | |
| | | OLS | FE | | OLS | FE | | OLS | FE | | OLS | FE |
| 1990 | 8.2 | 19.6 | 9.9 | 7.7 | 4.5 | 7.8 | 8.5 | 5.7 | 7.6 | 19.1 | 31.6 | 24.1 |
| 1991 | 8.2 | 18.6 | 9.6 | 7.8 | 4.5 | 7.9 | 8.8 | 5.5 | 7.3 | 19.5 | 28.0 | 23.9 |
| 1992 | 8.3 | 17.1 | 8.7 | 7.8 | 4.9 | 8.1 | 8.4 | 5.4 | 6.8 | 19.8 | 20.9 | 22.1 |
| 1993 | 9.5 | 17.1 | 9.2 | 7.6 | 4.8 | 8.2 | 8.5 | 5.2 | 6.6 | 20.0 | 24.9 | 23.2 |
| 1994 | 10.0 | 16.8 | 9.4 | 7.8 | 5.0 | 8.3 | 7.9 | 5.8 | 6.4 | 21.2 | 24.3 | 23.4 |
| 1995 | 10.6 | 17.6 | 10.2 | 7.9 | 5.1 | 8.4 | 8.1 | 6.2 | 7.1 | 22.3 | 21.8 | 23.6 |
| 1996 | 10.9 | 18.0 | 10.5 | 7.9 | 5.3 | 8.6 | 7.7 | 6.5 | 7.7 | 24.1 | 21.4 | 23.8 |
| 1997 | 13.0 | 18.5 | 13.0 | 9.2 | 6.4 | 8.0 | 4.6 | 6.4 | 7.1 | 31.0 | 24.7 | 26.7 |
| 1998 | 13.3 | 19.2 | 13.6 | 9.2 | 6.4 | 8.2 | 4.6 | 6.2 | 6.8 | 31.9 | 26.0 | 27.0 |
| 1999 | 13.3 | 18.5 | 13.5 | 9.1 | 6.4 | 8.1 | 4.3 | 6.3 | 6.9 | 32.1 | 26.5 | 27.4 |

According to official estimates, social services employ less labor than it is expected from international comparisons. However, the figures quoted do not account for military forces and so forth. Further study is necessary to reveal what narrower defined activities (education, health or public administration) mainly contribute to this negative deviation. Another question to study is finding the reasons of huge difference between official and LF survey estimates of social services employment in Russia.

## 5. THE SUPPLY OF LABOR TO THE SERVICE SECTOR

In this section, I investigate various issues of labor reallocation at the level of individual behavioral responses. In particular, the purpose is to consider possible differences in workforce characteristics and working arrangements between the service- and goods-producing sector and among specific service activities, the demographic structure of movers to and from the service sector, the characteristics which tend to raise the probability of changing work for services.

### 5.1. Data description

The data used in this section are from the 1994-2000 waves of the Russian Longitudinal Monitoring Survey (RLMS) based on the national probability sample. Industry codes were constructed by

K.Sabirianova and provided by the Davidson Data Center and Network of the William Davison Institute at the University of Michigan Business School.

The sample consists of employees, self-employed, those who are temporarily absent from work, and non-employed. First three groups are later referred as employed[7]. The non-employment category includes both unemployed and those out of the labor force. The focus on structural changes implied exclusion of workers younger than 15 older than statutory retirement age (55 for women, 60 for men). I restricted the sample to the working age population in order to minimize the effect of normal retirement and possible re-entrance of pensioners. The size of sample in 1994 is 6402 (4535 employed), in 1996 is 5952 (4042 employed), in 1998 is 6220 (3938 employed), and in 2000 is 6552 (4213 employed). Though the data were available also for 1995, this wave was dropped from the analysis to preserve equal two-year time-periods between two successive waves. To consider labor mobility I then constructed three matched samples of individuals who participated in two successive interviews. The size of the matched samples for those matched in 1994-1996 is 4101 (849 changed job or labor market status), for those matched in 1996-1998 is 4308 (840 changed job or labor market status), and for those matched in 1998-2000 is 4705 (1147 changed job or labor market status).

Since 1994 the labor market has shown an essential amount of sectoral restructuring (Table 10). The share of agriculture declined by 1.4%, the drop of industrial share was larger and equaled to 4% while the share of service employment increased by 4.8%. After financial crisis of 1998 the growth rate of service employment appears to slow down in comparison with the growth rate of employment in agriculture. As a result, the share of services slightly decreased in 2000. In industry, the after-crisis increase of production was not accompanied by the rise of industrial employment, but rather was achieved by the productivity growth. Within the service sector, the growth rates were highest in trade, commerce[8], municipal services, and public security; the largest decline was recorded in science.

Sectoral shares based on the RLMS sample are somewhat different from official estimates (Table 1), namely, the share of service is on average 2-3% higher in the RLMS than in official estimates while shares of agriculture and industry tend to be lower in the RLMS. This may be due to the wider spread of informal sector activities in services, which are not covered by official statistics and are incorrectly estimated by statistical bodies when calculating official estimates. Unofficial nature of the RLMS, probably, better deals with unregistered workers. Higher shares of agriculture in official estimates are partly explained by relatively high estimates of private farm workers used by official statistical bodies.

Table A12 illustrates the differences in the characteristics of workforce in the goods-producing and service sector. The service sector employees tend to be younger, and are more likely to be female, live in urban areas and have more schooling relative to those employed in agriculture and industry.

[7] Only primary jobs were considered.

[8] According to the OKONKh, commerce includes real estate activities, intermediation at the goods and security markets and other kinds of non-financial intermediation, renting (without any pronounced specialization), legal, accounting, book-keeping and auditing activities; tax consultancy; market research and advertising, business and management consulting.

Higher proportion of the service sector employees occupies managerial, professional and clerical positions while jobs in the goods-producing sector are mostly for craftsmen, operators, assemblers and laborers.

**Table 10.** Sectoral distribution of employment (% of total employment), RLMS.

| | 1994 | 1996 | 1998 | 2000 |
|---|---|---|---|---|
| Agriculture and forestry | 11.5 | 11.3 | 9.9 | 10.1 |
| Industry | 35.7 | 33.2 | 32.4 | 31.6 |
| Mining and manufacturing | 27.9 | 26.4 | 26.0 | 25.2 |
| Construction | 7.8 | 6.8 | 6.4 | 6.4 |
| Services | 50.5 | 53.2 | 55.6 | 55.3 |
| Transport | 6.5 | 6.1 | 6.4 | 6.4 |
| Communication | 1.1 | 1.3 | 1.1 | 1.0 |
| Trade | 8.1 | 7.9 | 8.7 | 10.1 |
| Commerce | 2.6 | 3.8 | 3.8 | 4.3 |
| Municipal utilities | 4.3 | 4.5 | 5.0 | 5.0 |
| Health | 7.0 | 7.6 | 8.5 | 7.8 |
| Education | 9.7 | 9.7 | 10.0 | 9.8 |
| Culture | 1.4 | 1.7 | 2.1 | 2.0 |
| Science | 2.5 | 1.6 | 1.5 | 1.3 |
| Finance | 1.2 | 1.4 | 1.4 | 1.1 |
| Administration | 2.4 | 2.7 | 2.7 | 2.5 |
| Public security | 3.9 | 4.8 | 4.4 | 4.2 |
| Other activities | 0.9 | 1.4 | 1.3 | 1.7 |
| Missing | 1.4 | 0.8 | 0.8 | 1.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of respondents | 4,894 | 4,382 | 4,248 | 4,508 |

*Note*: Sectoral distribution follows the OKONKh definition.

Workforce characteristics differ also across the service sub-sectors (Table A13). Firstly, the gender mix varies sharply. Women are over-represented in health, education, finance and insurance, trade, public administration and in communications. Men dominate in public security, transport as well as in industry and agriculture. Only in municipal services and in science the shares of men and women are similar. However, the gender composition was not stable in 1994-2000. Notable growth of the female share was observed in commerce, communications, trade, and health. The male share in-

creased in culture, finance, and industry. The growth of male service employment was slower than that of females, as a result, the share of males employed in services declined constantly over the transition period.

Though the average age almost similar for all sectors the age composition is not uniform across the service sub-sectors. Newly emergent or revitalized market-related sectors such as trade, commerce, and finance tend to employ younger workers whose skills and education are more relevant to market economy. Science has the highest average age among the all service sub-sectors and it was growing over the late 1990s. Science also shows the lowest proportion of young workers together with the highest proportion of workers in retirement ages. In 1994-2000 trade, culture, communications experienced huge inflow of young workers while their share in finance has been decreasing.

Concerning education, both industry and to greater extent agriculture demand much more low-educated labor than services. Within the service sector low-educated workers have the largest shares in housing services, communication and transport. By contrast, social services employ far fewer low-educated workers. In 1994-2000 the share of workers with less than secondary schooling decreased greatly mainly due to retirement of elder cohorts who tend to be less educated. The service sector is the largest employer for university-educated workers. Within the service sector, the average level of education is the highest in science, education, finance, and public administration.

### 5.2. Labor mobility

Rapid reallocation of labor towards the service sector is only possible if mediated by intensive labor mobility. Table 11 focuses on the distribution of the working age population. Industrial employment fell from 26.2% in 1994 to 20.6% in 2000. Shares of both services and non-employment tended to grow. The share of agriculture declined until 1998 and then slightly increased.

**Table 11.** Distribution of the working age population, per cent.

| | 1994 | 1996 | 1998 | 2000 |
|---|---|---|---|---|
| Agriculture | 8.5 | 8.1 | 6.7 | 6.9 |
| Industry | 26.2 | 23.4 | 20.8 | 20.6 |
| Services | 35.8 | 36.0 | 35.4 | 36.1 |
| Non-employment | 29.5 | 32.5 | 37.1 | 36.4 |
| Total (%) | 100 | 100 | 100 | 100 |
| N | 6,274 | 5,853 | 6,134 | 6,415 |

In general, two explanations of these trends are possible. The first possibility is that workers who left industry and agriculture ended up in non-employment, either unemployed or withdrawn from

the labor force. Their employers either shut down or stopped to hire new entrants to the labor market to replace the quits. Given that results in Table 11 are restricted to the working age population the outcome for workers with non-employment is particularly negative. The second possibility is that workers who left industry and agriculture found new jobs in services and new entrants postponed the entrance to the labor market to continue their studies. This option would indicate successful reallocation.

To answer the question about the nature of labor mobility in Russia I estimated probabilities of transitions between industry, agriculture and non-employment state. Figures 3-5 exhibit these flows in 1994-2000. Because of the focus on structural changes, the sample is restricted to the working age population (15-55 for women, 15-60 for men). Probabilities were calculated for two-year period. Before turning to discussion of these results, one precaution is necessary. Since we matched individuals across waves two years apart, our measures of labor mobility reflects job changes from one November to November two years after. There is no information on worker history between waves. Therefore, these measures miss some temporary transitions and underestimate the magnitude of labor mobility for jobs that were held less for than two years. Underestimation may be particularly important for younger ages whose jobs often last for short periods and for spells of unemployment, which are typically much shorter than two years[9].

The data demonstrate significant inertia in all four states, reflected in the largest probabilities of holding the same job (in brackets are the initial stocks of employment in that state). For example, Fig.3 shows that out of those who were employed in services in November 1994, 69.4% continued to hold their jobs two years later, 13.5% found new jobs in services, 11,7% moved to non-employment, 4.4% changed services for industry and 1% moved to agriculture. In 1996-2000, labor mobility in services slightly decreased, but the same is true for other broad industrial sectors. During the whole period from 1994 to 2000 services remained the most stable sector: proportion of those who continued to hold same jobs between two rounds of the survey was always higher in services than in industry or agriculture. Most of job-to-job movers moved mostly within sectors, not across sectors. However, it is important to note that each sector has positive inflows as well as outflows and the turnover is quite large even in stagnating sectors. Since job-to-job movers did not contribute much to labor reallocation, sectoral variation in the difference between withdrawal from and entrance to the labor force is the main explanation of changing distribution of labor.

[9] In order to get an idea of how large is the measure error for jobs lasting less than 24 months, I compared one- and two-year mobility rates using the 1995 wave of the RLMS. Out of those who changed jobs in 1995 29% changed jobs again in 1996, 15 % moved to non-employment. When mobility rates are calculated on the two-year basis, job changes by the latter group are ignored. Out of those who had work in 1994 but moved to non-employment in 1995, 62% remained non-employed in 1996 and 38% found jobs in 1996. When mobility rates are calculated on the two-year basis, temporary unemployment by the latter group is ignored. New entrants to the labor force and those who return to work after non-employment are particularly unlikely to have stable jobs. Out of those who had no work in 1994 but got a job in 1995, by November 1996 only 47% held the same jobs, while 25% moved to other jobs and 28% moved to non-employment. Again with calculation on the two-year basis, most of these transitions are ignored.

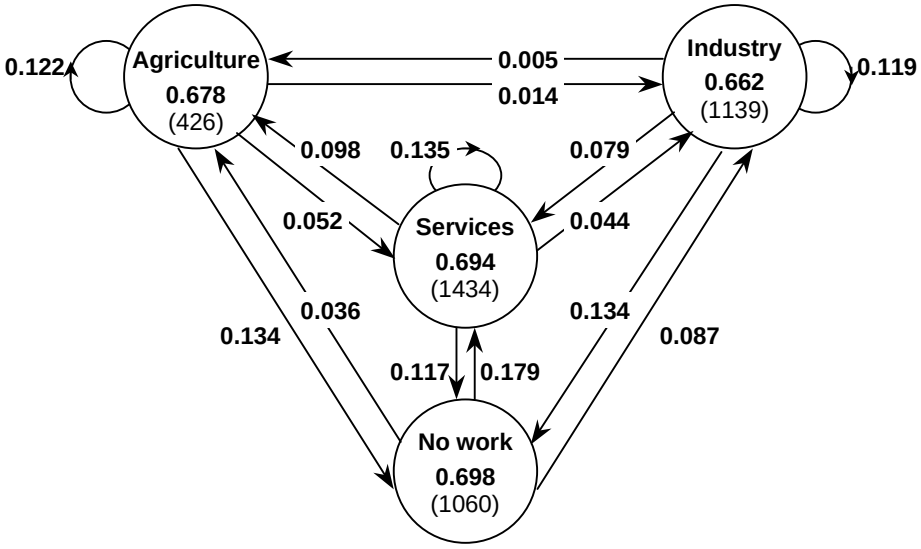


**Fig. 3.** Intersectoral labor mobility in Russia, Nov.1994-Nov.1996.

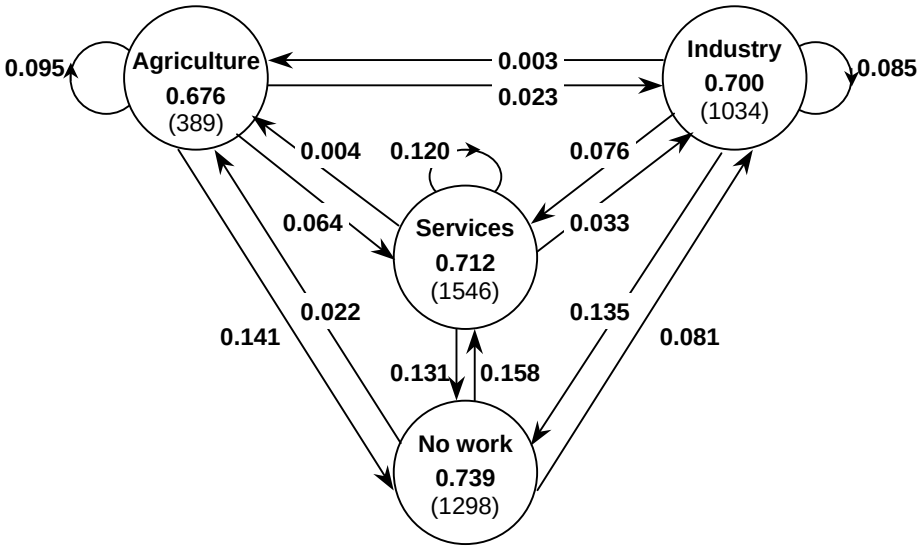


**Fig. 4.** Intersectoral labor mobility in Russia, Nov.1996-Nov.1998.

Next, I disaggregated the service sector into 12 sub-sectors and examined employment patterns in each of them separately. To estimate the degree of reallocation within the Russian service sector gross outflows and gross inflows were considered separately. Tables A14-A16 show that there was a significant heterogeneity among the service sub-sectors: some sub-sectors were growing, the others were downsizing. The growth of employment, net inflows, is given in percentage to the beginning of each two-year period. The results show that continuous decline over six years occurred only in communications and science. Continuous growth was observed in public administration, municipal utilities, and culture. Other sub-sectors had both periods of growth and decline.

In 1994-1996 the decline was observed in 5 out of 12 service sub-sectors. It ranged from a low of 2.7% in health to a high of 22.5% in science. The growth rates were the highest in commerce and

finance. Gross inflows were largest in growing sub-sectors and smallest in declining sub-sectors. For example, commerce hired in 1994-96 nearly the same number of workers as this sub-sector employed in 1994. In general, except for science all service sub-sectors were quite active in attracting new workers, but in declining sub-sectors these in most cases just replace existing employees. Gross turnover is an indicator of overall labor reallocation or 'churning'. Labor turnover was extraordinary high by international standards in trade and commerce and the lowest in government-dominated sub-sectors (health, science, education).

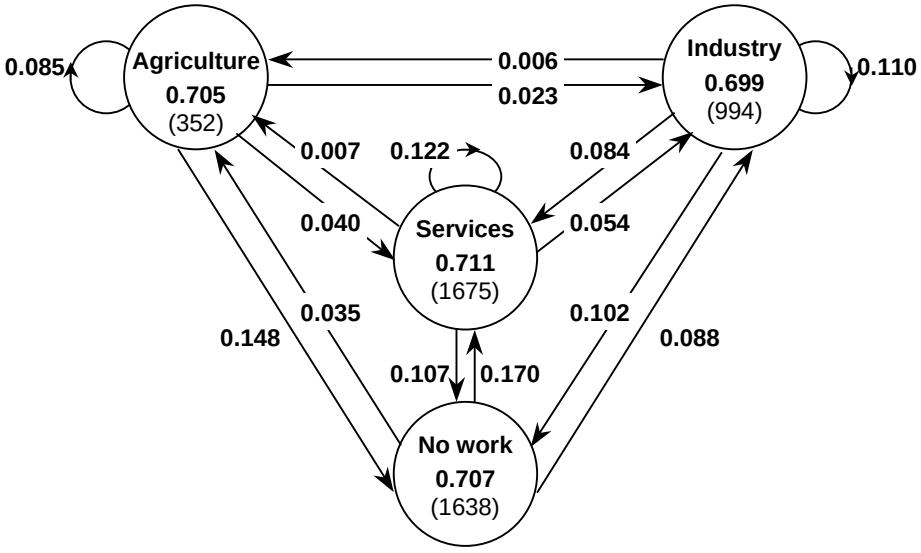


**Fig. 5.** Intersectoral labor mobility in Russia, Nov.1998-Nov.2000.

In 1996-1998 the decline spread to 6 out of 12 service sub-sectors. It varied from 4.5% in finance to 11.7% in science. In finance employment dropped abruptly because of the collapse of several large banks and low hiring in the remaining banks after the August crisis in 1998: gross inflows decreased sharply in comparison with the previous period. The rates of net outflows were highly high in communications and commerce. In commerce the decline of employment occurred along with high gross turnover in this sub-sector and was caused by the fall in inflow rates. Health and culture head the list of growing sub-sectors though with markedly lower rates than the leaders of 1994-96. Gross turnover in services remained high but became more uniform (40-50%) with notable exception for trade and commerce.

In 1998-2000 the decline was recorded in five sub-sectors with zero growth rates in the other two (transport and science). The decline was moderate in all sub-sectors, but in finance (-18%), reflecting negative consequences of the financial crisis. Economic growth gave impulse for the rapid upsurge in trade and commerce, those increased by 13.9% and 15.6%, respectively. Gross turnover showed no tendency to weaken.

**Table 12.** Sources of service employment.

| | Same service sub-sector | Other service sub-sector | Other Branches | Non-employment | Total Number |
|---|---|---|---|---|---|
| | In % of those who found a job in that service sub-sector in Nov.1994-Nov.2000 | | | | |
| Transport | 35.7 | 15.3 | 19.7 | 29.3 | 157 |
| Communication | 25.0 | 12.5 | 25.0 | 37.5 | 24 |
| Trade | 27.6 | 13.5 | 16.3 | 42.5 | 416 |
| Commerce | 12.9 | 29.3 | 21.1 | 36.7 | 147 |
| Municipal utilities | 21.5 | 15.1 | 34.3 | 29.1 | 172 |
| Health | 37.1 | 16.2 | 9.6 | 37.1 | 197 |
| Education | 31.4 | 13.6 | 13.6 | 41.4 | 220 |
| Culture | 30.2 | 25.4 | 11.1 | 33.3 | 63 |
| Science | 58.8 | 17.6 | 23.5 | 0.0 | 17 |
| Finance | 39.5 | 23.7 | 15.8 | 21.1 | 38 |
| Administration | 30.1 | 21.9 | 19.2 | 28.8 | 73 |
| Public security | 35.1 | 19.6 | 14.4 | 30.9 | 97 |
| Total | 29.3 | 17.1 | 17.8 | 35.8 | 100.0 |
| Total number | 475 | 277 | 289 | 580 | 1621 |

Table 12 sheds light on the origins of newly employed in different service sub-sectors. Though those who already worked in the beginning of each period dominate over those who had no job, the relative importance of non-employment source was growing from period to period: from 32.3% in 1994-96 to 42.4% in 1998-2000. Among the service sub-sectors non-employment was the most important source of new workers for trade, education, communications, and commerce. Job-to-job transitions within the sector were most frequent in science, finance, health, and transport. These findings indicate the diminishing contribution of job-to-job labor mobility to sectoral restructuring.

### 5.3. Determinants of labor mobility

**Theoretical framework.** Our simple model of mobility decisions is based on wealth-maximizing on-the-job-search. Job-changing decisions are affected by the evolution of wages within a job as well as by the arrival of external wage offers. The model builds on the papers by Earle (1997), Boeri and Flinn (1999), Lehmann and Wadsworth (2000).

There are three sectors in economy: agriculture, industry, and services. Sectors differ in their production potentials, $f_i = f_i(t, \varphi_{it})$, where $\varphi_{it}$ is a shock at time t common to all firms in sector $i$. Let $y_i(X, T; Z)$ denote the productivity of a given worker in sector $i$, which is distributed over the unit interval [0;1]. It is a function of his individual characteristics (Z), tenure (T) and labor market experience in this sector (X). Decision rules are static in the sense that only current period returns are

taken into account, but no the expected lifetime gains associated with the options. The use of static decision rules may be justified by two reasons. First, in a rapidly changing situation of transition to a market economy people may not be able to predict the probabilities of future states and, consequently, the evolution of future wage rates. Second, under high inflation, which was in place in most transition countries in the beginning of transition, people would need to use very high discount rates so that future rewards would be given extremely low weights. Therefore, static rules may well approximate the real process of decision-making in the transition period.

The worker employed in sector *i* at time t earns the wage given by:

$$w_i = y_i (X, T; Z) f_i (t, \varphi_{it}) + \varepsilon, \quad (4)$$

where $\varepsilon$ is the value of the current match between the worker and his employer. Let $\varepsilon$ be positive for workers in a good match and negative for workers in a poor match. In other words, workers in poor match are encouraged to separate through paying them low wages, well matched workers are retained by increasing their wages. The value of the match is not known ex ante. Rather, the worker must for the employer for a period before $\varepsilon$ is discovered.

Except for differences leading to the variation in productivity, *y*, applicants to jobs in a given sector are all observationally alike and the expected value of a match is zero. Hence, the wage offer ($w_j$) of the other firm is given by:

$$w_j = y_j (X, 0; Z) f_j (t, \varphi_{jt}), \quad (5)$$

Our last assumption concerns the treatment of mobility costs. In the context of this paper mobility are associated with search efforts, travel expenses, costs of additional training and so forth. However, since the RLMS does not follow up people if they move to other regions, mobility costs are likely to be negligibly low. Therefore, we assume that mobility is costless.

The decision is taken at the end of period t-1. The worker has two options: (1) to remain with his current employer or (2) to quit and start with a new employer. The decision is based on a simple comparison of the wage at tenure T in the current job and the wage in a new job with zero tenure. The probability of accepting the external wage offer is equal to:

$$Pr \{w_j - w_i > 0\} = Pr \{y_j (X, 0; Z) f_j (t, \varphi_{jt}) - y_i (X, T; Z) f_i (t, \varphi_{it}) - \varepsilon > 0\}, \quad (6)$$

First, let us consider the case when job change does not involve the change of the sector of employment, i.e. $i = j$. The model predicts that job change within the sector is possible if the effect of tenure is negative (it does not need to be negative at all tenure levels instead it may be non-linear and turn into negative at a certain tenure level) or if the worker is currently in a poor match. The probability of inter-sectoral transition increases with an increase in the productivity of labor or in the production potential of the destination sector, with a decline in the productivity of labor or in the production potential of the origin sector, and with the lower quality of the job specific match.

**Econometric specification.** Our empirical strategy is to estimate a multinomial logit model of sectoral mobility as a function of labor productivities and production potentials of each sectors, and the quality of the job-specific match. The dependent variable takes on four outcomes: (1) staying at the

same job; (2) new job in agriculture; (3) new job in industry; (4) new job in services. At this stage, the sample is restricted to stayers and job-to-job movers.

Individual productivity in each sector is assumed to be determined by age, gender, education, occupation, job tenure, and experience in the destination sector. However, information about experience in each sector is not available, thus, instead I used a dummy variable for the origin sector which indicates whether a worker had experience in this sector right before the job change occurred. Age should increase the probability of staying at the same job, age squared was added to count for non-linearity of this relationship. Labor mobility is expected to decline as tenure grows. People with higher levels of schooling are more employable in new jobs especially in growing sectors, but at the same time they are less likely to be laid off from their current jobs. Unfortunately, the RLMS does not allow to construct any variable reflecting the evolution of sector's production potentials. Thus, I used the Goskomstat data on regional indices of industrial and agricultural production taken from Goskomstat (1999).

Job-matching theory predicts that movers should come from the lower portion of the wage distribution where workers in poor matches are clustered. A benefit of the RLMS is the availability of wage information. But the problem is that there is a large amount of missing wage information for individuals reporting that they are currently employed at the time of interview. In particular, it turned out that roughly 30% (4868 out of 16730) of employed individuals did not report their wages. Unfortunately, the missing wage pattern is non-random. Estimates of a logit model showed that the probability of non-reporting is significantly affected by age, gender, region, occupation, industry, urban/rural area inhabitance, and incidence of wage arrears. In order to deal with this problem, I assigned wages to non-reporting employed individuals by matching them to observations on the reporting individuals with same characteristics. Matching characteristics included year, region of residence, gender, sub-sector (25 categories), occupation group (10 categories), and presence of wage arrears. Non-reporting individuals were attributed an average wage of individuals with the same characteristics. In this way I succeeded in assigning wage to 63% of missing cases. Then I calculated wage indices (for each wave separately) as a ratio of an individual wage to the average wage in his employment status group.

A set of local characteristics is used to control for the prospects of local labor market. Control for local labor market conditions is especially important in Russia where inter-regional labor mobility is known to be very low. The RLMS sample was divided into eight distinct regions: Moscow and St. Petersburg Metropolitan Areas; the North North-West Region; the Volga Region; the Urals; Eastern Siberia and the Far East; the North Caucasus; Western Siberia; and the Central Region. Regions vary drastically in industrial structures, incomes, rates of growth, etc. Employee-initiated separations clearly depend on the current situation at local labor market. Urban workers have access to more job offers, while rural inhabitants are often 'linked' to the single employer in the neighborhood. Changes in the local labor market are also captured by the dynamics of regional unemployment rates. The data on regional unemployment rates at the oblast level for 1994, 1996, 1998 (following the ILO's definition) are taken from Goskomstat (2001b).

Individual wages may also affected by the demand shocks at the firm level. The RLMS provides the limited list of available firm characteristics, among which the most appropriate are ownership and firm size variables. Ownership dummy indicates whether respondent is an owner or co-owner of the enterprise where he works. Aghion and Blanchard (1994) and Blanchard (1997) argue that high unemployment may provoke resistance to restructuring through labor shedding in state firms or firms privatized internally. Since insider power may act to prevent lay-offs, holding shares of employing firm would raise the probability of staying at the same job.

**Tests against the data.** The estimation results are presented in Table 13. They suggest that low quality of current job matches, tenure effects and labor market segmentation are the most powerful explanations of labor mobility.

**Table 13.** Estimation results from multinomial logit model of labor mobility (with assigned wages).

| | Agriculture | | Industry | | Services | |
|---|---|---|---|---|---|---|
| | Coeff. | t-stat | Coeff. | t-stat | Coeff. | t-stat |
| Age | 0.156 | 1.670 | -0.003 | -0.068 | 0.001 | 0.034 |
| Age squared | -0.002 | -1.843 | 0.000 | -0.206 | 0.000 | -0.714 |
| Tenure | -0.143 | -3.602 | -0.180 | -7.957 | -0.152 | -7.487 |
| Tenure squared | 0.004 | 2.839 | 0.004 | 5.725 | 0.003 | 4.562 |
| Gender (male = 1) | 0.347 | 1.120 | 0.566 | 3.986 | 0.211 | 1.876 |
| Education (primary omitted) | | | | | | |
| Incomplete secondary | -0.450 | -0.539 | 0.560 | 0.738 | -0.575 | -1.021 |
| Complete secondary | -0.529 | -0.616 | 0.335 | 0.444 | -0.655 | -1.172 |
| Technical college | -0.473 | -0.534 | 0.200 | 0.263 | -0.610 | -1.082 |
| University and graduate | 0.338 | 0.344 | 0.108 | 0.140 | -0.346 | -0.603 |
| Location (urban = 1) | -1.936 | -4.313 | 0.570 | 2.644 | 0.694 | 4.383 |
| Wage index | -0.582 | -2.799 | -0.036 | -0.533 | -0.026 | -0.513 |
| Wage arrears (yes = 1) | 0.447 | 1.670 | -0.121 | -1.013 | 0.017 | 0.183 |
| Ownership | -0.067 | -0.268 | -0.200 | -1.325 | 0.042 | 0.305 |
| Firm size (<11 omitted) | | | | | | |
| 11-50 | -0.455 | -1.555 | -0.226 | -1.055 | -0.470 | -3.299 |
| 51-100 | -1.022 | -2.514 | -0.370 | -1.532 | -0.698 | -4.136 |
| 101-1000 | -0.287 | -0.912 | -0.254 | -1.216 | -0.720 | -4.766 |
| >1000 | -0.608 | -0.920 | -0.116 | -0.499 | -0.913 | -4.646 |
| Sector (agriculture omitted) | | | | | | |
| Industry | -1.638 | -3.549 | 1.732 | 4.812 | -0.040 | -0.169 |
| Services | -1.352 | -3.791 | 0.524 | 1.461 | 0.417 | 1.864 |
| Unemployment rate | -0.053 | -1.386 | 0.010 | 0.519 | -0.023 | -1.463 |
| Index of industrial production | -0.001 | -0.067 | 0.001 | 0.171 | -0.001 | -0.335 |
| Index of agricultural production | 0.000 | 0.041 | -0.002 | -0.364 | 0.003 | 0.705 |
| Constant | -30.851 | . | -2.427 | -1.669 | -0.315 | -0.282 |
| Number of obs = 5,474 Log likelihood = -3,353.9905<br>Wald chi2(106) = 11,523.97 Pseudo $R^2$ = 0.1614 | | | | | | |

*Notes*: The comparison group is those who stayed at same jobs. Regressions also contain regional and occupational dummies.

Age does not affect the probability of transition to either sector. Tenure effects appear to outperform age effects. Tenure-mobility relationship is non-linear and significant in all outcomes. The probability to quit from current declines as tenure grows; only when tenure exceeds 20 years this relationship reverses. Positive association between tenure and the probability to keep job is in line with the firm-specific human capital and insider power explanations. At tenures in excess of about 20 years the probability of transition to either state increases relative to the probability of staying. This may be explained by obsolete human capital and low productivity of such workers in comparison with younger ones. Non-linearity of tenure-mobility relationship also suggests that wage growth is larger in the beginning of jobs. Consequently, workers may even accept a wage cut while changing jobs since expected on-the-job wage growth is declining.

Gender is significant only in industry. Even controlling for occupation men are more likely to find new jobs in industry; for new jobs in services and agriculture gender does not matter. This may support the view that women are subject to discrimination in hiring in industry. Concerning schooling, the differences among educational levels in mobility outcomes are very small.

Urban/rural distinction is significant in all outcomes. Urban inhabitants are more likely to find new jobs in industry and services than turn to agriculture. The rural inhabitants are less willing to leave their current jobs in favor of new jobs in industry and services, but easily move for new jobs in agriculture. The last finding reflects the lack of industrial and service job offers in rural areas. Regional rate of unemployment does not appear to be significant in job transitions suggesting that most of separations are voluntary quits.

The probability to move declines as wage grows but the effect is significant only with regard to new jobs in agriculture. These findings favor the matching theory of mobility. Outside options in industry and services are often attractive for those in upper part of wage distribution. In the accord with job-matching explanation is the fact that workers are reluctant to leave jobs in larger firms, which are more likely to offer career promotion and, thus, higher wage growth. Being an owner or co-owner of employing enterprise, does not bind workers to their current jobs. Neither it allows to execute any insider power.

Finally, most of job changes occur within the sector. Growth of production potentials outside the current sector of employment is not likely to motivate mobility, neither it intensifies mobility within the same sector. Workers are not responsive to foreseen changes in the sectoral demand for labor.

## 6. CONCLUSION

Service employment in Russia has grown quite dramatically in the 1990s, despite the transformational crisis that afflicted the country. This increase can be interpreted as a shift from initially distorted structure to the one, which is consistent with market economy requirements. In 1990 actual share of service employment was about 6% lower than internationally expected norm, by 1996 this gap was virtually eliminated. Development of services in Russia turns to be more impressive than in

many other transitional countries. However, further research is necessary to elucidate the relationship between reform progress and changes in industrial structures.

As a by-product of measuring the service gap for Russia, this study provides international evidence that supports the Baumol-Fuchs hypothesis on lagging productivity as the central source of the world-wide expansion of service economies. However, income elasticity of demand for services also appears to contribute significantly to the rise of services in the past three decades. Different from earlier studies by other authors, I included explicitly demographic and foreign trade variables. Children are found to be relatively goods-intensive, while the elderly are relatively service-intensive. Another finding is that at different levels of economic development service employment adheres to different rules. In particular, effect of real income increase is large in low and high income countries but is negligible in middle income countries; differential productivity effect tends to dampen down with the rise of income. I also failed to find the positive effect of higher female participation mentioned by other researchers.

The disaggregated service share patterns were analyzed in some detail here and their diverse development suggests that the service sector as an aggregate may be an excessively large category for serious study. Estimates of the gaps for specific service sub-sectors revealed significant overshooting in the size of social service and transportation combined with underdevelopment of distributive and business services. This finding suggests that restructuring within the service sector itself will be a task for policy-makers in coming years.

Rapid reallocation of labor towards the service sector is only possible if mediated by intensive labor mobility. Empirical analysis based on the household survey data showed that despite the overall rise in labor mobility, most job-to-job movers moved within sectors, not across sectors. Thus, sectoral variation in the difference between withdrawal from and entrance to the labor force is the main explanation of changing distribution of labor.

An econometric model of sectoral mobility outlined in this study indicates that low quality of current job matches, tenure effects and labor market segmentation are the most powerful explanations of labor mobility. In particular, the probability to find new job in services is higher for those employed in urban areas and for those who have experience in services. On the other hand, jobs in services are less attractive for workers at higher tenure levels and for those currently employed in large firms.

## APPENDIX

**Table A1.** Summary statistics.

| Variable | Stat. | 1960 (N=175) | 1970 (N=177) | 1980 (N=181) | 1990 (N=178) | 1995 (N=86) | 1999 (N=59) |
|---|---|---|---|---|---|---|---|
| Share of services in total employment, % | Mean | 24.74 | 29.86 | 36.88 | 41.78 | 54.49 | 57.33 |
| | Std.dev | 15.10 | 16.57 | 18.87 | 20.41 | 16.19 | 14.76 |
| GDP per capita, PPP corrected | Mean | n.a. | n.a. | 4,026.3 | 6,232.8 | 11,392.8 | 13,719.8 |
| | Std.dev | n.a. | n.a. | 4,204.0 | 6,105.0 | 8,460.7 | 9,159.1 |
| Urbanization rate, % | Mean | 35.21 | 40.86 | 46.55 | 51.29 | 63.56 | 68.0 |
| | Std.dev | 23.85 | 24.23 | 24.61 | 24.35 | 21.45 | 17.07 |
| Female LFP rate, % | Mean | 29.52 | 30.11 | 32.59 | 34.62 | 37.20 | 39.57 |
| | Std.dev | 15.07 | 13.90 | 12.77 | 11.40 | 10.05 | 8.29 |
| Productivity ratio | Mean | 0.41 | 0.54 | 0.90 | 0.81 | 0.88 | 0.84 |
| | Std.dev | 0.28 | 0.63 | 1.25 | 0.61 | 0.34 | 0.32 |
| Share of population aged 0-14, % | Mean | 38.71 | 38.93 | 36.76 | 35.14 | 27.56 | 23.87 |
| | Std.dev | 7.09 | 8.41 | 9.42 | 10.04 | 8.70 | 7.83 |
| Share of population aged 65 and above, % | Mean | 4.90 | 5.30 | 5.85 | 6.00 | 8.81 | 10.48 |
| | Std.dev | 2.64 | 3.23 | 3.88 | 4.00 | 5.54 | 4.54 |

*Notes*: N is a number of observations of the service employment share. The sample is restricted to observations with non-missing values of the service employment share.

**Table A2.** Deviations of service shares (1990, Fuchs approach).

| Negative Deviations | | | Positive deviations | | |
|---|---|---|---|---|---|
| More 20% | 10-20% | 10 – 0% | 0 – 10% | 10-20% | More 20% |
| Tanzania, Rwanda, Bhutan, China, Gambia, Guinea, Comoros, Burundi, Niger, Papua New Guinea, Burkina Faso, Thailand, Solomon Islands, Romania, Albania, Angola, India, Zimbabwe, Senegal, Gabon, Turkey, Botswana, Congo Dem. Rep., Cameroon, Haiti, Central African Rep., Bulgaria, Guatemala, Lithuania, Poland, Morocco, Belarus, Moldova, Namibia, Bahrain, Estonia, Ukraine, Bangladesh, Uganda, Turkmenistan, Mauritius, Nepal, Macedonia, Hungary, **Russia**, Latvia, Portugal | Greece, Korea, Lao, Sri Lanka, Swaziland, Paraguay, Tunisia, Chad, Togo, Austria, Fiji, Armenia, Kazakhstan, Algeria, Maldives, Equatorial Guinea, Cambodia, Philippines, Japan, Spain, Madagascar | Iceland, Azerbaijan, Kyrgyzstan, Croatia, Sierra Leone, Macau, Cyprus, Italy, Mexico, Costa Rica, Cape Verde Ireland, Malaysia Finland, Ghana, Slovakia, South Africa, Iran, Cote d'Ivoire, Zambia, Hong Kong, Argentina | El Salvador, Belgium, Egypt, France, Guinea-Bissau, Colombia, Belize, Pakistan, Luxembourg, UK, Denmark, Barbados, New Zealand, Bolivia, New Caledonia, Singapore, Sweden, Saudi Arabia, Brazil, Peru, USA, Norway, Netherlands, Syria, Australia, Canada, Israel, Malta | Chile, Uruguay, Nicaragua, Jamaica, Ecuador, Trinidad and Tobago | Venezuela, Panama, Mongolia, French Polynesia, Bahamas, Guyana, Jordan, Mauritania, Lesotho, Yemen, Mali, Mozambique<br>Lebanon, Suriname, Benin, Congo, Kenya, Nigeria, Ethiopia, Malawi |

**Table A3.** Definitions of Variables Used in Section 4.

| Variable | Definition |
|---|---|
| Service share | % of total labor force employed in the service sector corresponding to divisions 6-9 (ISIC revision 2) or tabulation categories G-P (ISIC revision 3). |
| Log GDP | The logarithm of PPP-corrected per capita GDP. |
| Urbanization | The midyear share of the total population living in areas defined as urban in each country and reported to the UN. |
| Female LFP | Female labor force activity rate (% of female population ages 15-64; World Bank estimates) |
| Log productivity ratio | The log ratio of labor productivities in the goods (agriculture + industry) and service sectors. Sectoral productivity is per worker value added in the relevant sector measured in current US dollars. |
| Age 0-14 | The share of total population aged 0-14. |
| Age 65+ | The share of total population aged 65 and older. |
| Agricultural imports/exports | % of merchandise imports/exports. Agricultural raw materials comprise SITC section 2 (crude materials except fuels) excluding divisions 22, 27 (crude fertilizers and minerals excluding coal, petroleum, and precious stones), and 28 (metalliferous ores and scrap). |
| Manufactures imports/exports | % of merchandise imports. Manufactures comprise commodities in SITC sections 5 (chemicals), 6 (basic manufactures), 7 (machinery and transport equipment), and 8 (miscellaneous manufactured goods), excluding division 68 (non-ferrous metals). |
| Exports | Exports of goods and services (% of GDP) |
| FDI | Foreign direct investment, net inflows (% of GDP) |
| Private consumption | Household final consumption expenditure for purchasing goods and services (% of GDP) |
| Government consumption | General government final consumption expenditure (% of GDP) |
| Agriculture VA | Value added of agriculture (% of GDP) |
| Industry VA | Value added of industry (% of GDP) |
| LF survey | Dummy variable for the source of data: 1 – LF surveys, 0 - official estimates |
| Source | Dummy variable for LF survey coverage: 1 – urban areas only, 0 – whole country |
| Socialist | Dummy variable for being a socialist country: 1 – socialist country. |

**Table A4.** Effects of foreign trade.

| Independent variables | Pooled OLS | | Fixed-effects OLS regression | |
|---|---|---|---|---|
| | Coeff. | t | Coeff. | t |
| Log GDP | 3.245 | 5.735 | 1.531 | 2.243 |
| Female LFP | -0.045 | -1.486 | 0.124 | 1.565 |
| Log productivity ratio | 8.145 | 12.249 | 10.328 | 16.939 |
| Urban | 0.281 | 18.063 | 0.327 | 7.725 |
| Age 0-14 | 0.245 | 3.037 | 0.072 | 0.609 |
| Age 65+ | 0.885 | 7.451 | 1.220 | 6.000 |
| LF survey | 6.697 | 11.050 | 3.077 | 7.262 |
| Socialist | -10.630 | -10.798 | -4.737 | -4.947 |
| Agricultural imports | -1.131 | -8.083 | -0.351 | -2.980 |
| Manufactures imports | 0.018 | 0.736 | 0.049 | 2.533 |
| Agricultural exports | -0.142 | -3.800 | -0.085 | -2.374 |
| Manufactures exports | -0.039 | -3.778 | -0.007 | -0.484 |
| Exports | 0.040 | 4.868 | -0.026 | -1.794 |
| Constant | -44.824 | -6.199 | -47.328 | -5.226 |
| | $R^2 = 0.7623$<br>F(25, 1815) = 404.60<br>Prob > F = 0.0000 | | $R^2$: within = 0.6852 F(14, 786) = 122.20<br>between = 0.7904 Prob > F = 0.0000<br>overall = 0.7632 | |

*Note*: OLS standard errors adjusted for heteroskedasticity. OLS regression also controls for survey coverage and missing values in all variables except dummy variables.

**Table A5.** Pooled OLS and fixed effects models for income groups.

| | All income groups | Low income | Lower middle income | Upper middle income | High income |
|---|---|---|---|---|---|
| Pooled ols | | | | | |
| Log GDP | 4.448* | 2.430 | 0.564 | 6.610* | 9.579* |
| Female LFP | -0.032 | 0.090 | -0.112 | -0.334* | 0.258* |
| Log productivity ratio | 8.861* | 10.263* | 13.383* | 4.926* | 6.585* |
| Urban | 0.314* | 0.172* | 0.387* | 0.054 | 0.214* |
| Age 0-14 | 0.370* | 0.671* | -0.200 | 0.675* | 0.381* |
| Age 65+ | 0.748* | 1.629* | -0.890* | 2.328* | 0.016 |
| LF survey | 5.267* | 4.692* | 1.732 | 6.500* | 1.314 |
| Socialist | -9.946* | 2.841* | -14.230* | -13.607* | -12.901* |
| Constant | -65.577* | -73.172* | -23.776 | -60.8895* | -95.038* |
| $R^2$ | 0.7332 | 0.6437 | 0.7722 | 0.5987 | 0.7088 |
| Fixed effects | | | | | |
| Log GDP | 1.480* | 1.197 | -0.087 | -2.629 | 6.391* |
| Female LFP | 0.055 | -0.688* | 0.111 | -0.571* | 0.084 |
| Log productivity ratio | 7.501* | 8.047* | 6.234* | 6.586* | 12.790* |
| Urbanization | 0.350* | 0.296* | 0.316* | 0.534* | 0.510* |
| Age 0-14 | -0.126 | -0.345 | -0.486* | -0.986* | 0.524* |
| Age 65+ | 1.642* | 4.235* | 0.826 | 1.372 | 1.328* |
| LF survey | 3.334* | 3.377 | 3.842* | 2.857* | 0.800 |
| Socialist | -4.829* | -4.029 | -3.033* | -6.712* | n/a |
| Constant | -31.500* | -.548 | 4.923 | 47.661* | -127.130* |
| $R^2$: within | 0.6201 | 0.5834 | 0.6357 | 0.6622 | 0.7514 |
| between | 0.7352 | 0.5413 | 0.2394 | 0.1387 | 0.6739 |
| overall | 0.6997 | 0.5491 | 0.2157 | 0.1202 | 0.7337 |
| Number of countries | 141 | 51 | 41 | 23 | 26 |
| Average number of observ. per country | 7.7 | 3.5 | 7.5 | 10.7 | 13.5 |

*Notes*: A specification including foreign trade-related variables was also considered. Inclusion of these variables did not change much the reported coefficients. Foreign trade per se does not influence significantly the service sector employment. Higher manufactures exports encourage services growth in low and middle income countries. Agricultural imports have positive effect on services in middle income countries. * Hereafter denotes statistically significant at the 5% level.

**Table A6.** Actual and long-run equilibrium service shares in transition countries.

| Country | Year | Actual share | Whole sample | | | | Relevant income group | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | GDP | | GDP, urban, female LFP, prod. ratio, demography | | GDP | | GDP, urban, female LFP, prod. ratio, demography | |
| | | | FE | OLS | FE | OLS | FE | OLS | FE | OLS |
| Bulgaria | 1999 | 44.3 | 41.3 | 45.9 | 41.2 | 48.5 | 39.7 | 46.2 | 40.3 | 62.8 |
| China | 1999 | 13.1 | 19.2 | 42.1 | 18.4 | 30.0 | 16.2 | 43.1 | 16.5 | 32.6 |
| Czech Rep. | 1999 | 55.0 | 53.0 | 62.6 | . | 64.6 | 52.9 | 62.1 | . | 77.2 |
| Estonia | 1999 | 59.4 | 53.3 | 57.6 | 53.0 | 56.2 | 53.8 | 59.0 | 54.4 | 71.4 |
| Croatia | 1999 | 52.8 | 56.5 | 56.2 | 57.5 | 59.7 | 56.6 | 58.1 | 57.0 | 76.5 |
| Hungary | 1999 | 58.9 | 56.7 | 61.1 | . | 61.2 | 57.3 | 61.2 | . | 77.2 |
| Lithuania | 1999 | 52.9 | 51.3 | 55.0 | 51.1 | 56.5 | 53.2 | 53.3 | 51.4 | 64.4 |
| Latvia | 1999 | 58.6 | 55.7 | 54.3 | 54.0 | 55.4 | 56.6 | 52.7 | 54.4 | 63.9 |
| Moldova | 1999 | 37.5 | 39.9 | 41.6 | 36.1 | 40.7 | 35.1 | 37.2 | 36.9 | 20.4 |
| Poland | 1999 | 50.6 | 48.2 | 57.7 | 48.0 | 52.0 | 48.0 | 59.1 | 48.7 | 66.0 |
| Romania | 1999 | 30.7 | 34.4 | 53.9 | 30.8 | 44.7 | 35.3 | 52.3 | 31.4 | 52.1 |
| Russia | 1999 | 58.8 | 54.4 | 56.3 | 56.9 | 63.1 | 56.5 | 58.2 | 57.1 | 70.4 |
| Slovenia | 1998 | 48.5 | 47.9 | 58.1 | 48.8 | 48.0 | 48.2 | 64.0 | 48.6 | 55.2 |
| Slovakia | 1999 | 54.2 | 54.5 | 60.3 | 52.1 | 52.0 | 54.4 | 60.6 | 52.8 | 64.2 |
| Ukraine | 1998 | 46.5 | 45.1 | 41.2 | 45.2 | 51.7 | 45.4 | 41.1 | 45.5 | 19.8 |

**Table A7.** Results for specific sub-sectors (similar sets of explanatory variables).

| | Trade | | Transport | | Business services | | Social services | |
|---|---|---|---|---|---|---|---|---|
| | OLS | FE | OLS | FE | OLS | FE | OLS | FE |
| Log GDP | 2.443* | -0.531 | -0.341* | 0.446* | 2.727* | 2.593* | 1.261* | -0.518 |
| Female LFP | -0.108* | 0.025 | 0.004 | -0.132* | 0.059* | 0.109* | -0.040 | 0.179* |
| Log productivity ratio | 1.693* | 2.354* | 0.266* | 0.143 | 0.232 | 0.292 | 7.261* | 3.558* |
| Urbanization | 0.047* | 0.199* | 0.050* | 0.055* | 0.046* | -0.014 | 0.143* | 0.059* |
| Age 0-14 | -0.248* | -0.206* | -0.067* | -0.067* | 0.093* | 0.248* | 0.600* | 0.091 |
| Age 65+ | -0.635* | 0.233* | -0.045 | 0.011 | 0.042 | 0.787* | 1.365* | 0.843* |
| LF survey | 1.625* | 2.130* | 0.704* | -0.501* | 1.235* | -0.759* | 4.528* | 2.589* |
| Socialist | -6.931* | -1.863* | 1.440* | -0.065 | -2.597* | -0.188 | -2.153* | -2.072* |
| Constant | -0.130 | -0.859 | 6.131* | 4.781* | -28.554* | -34.810* | -59.656* | -10.119 |
| $R^2$ within | | 0.4897 | | 0.2044 | | 0.4998 | | 0.3849 |
| between | | 0.1314 | | 0.2118 | | 0.4376 | | 0.4022 |
| overall | 0.5001 | 0.2439 | 0.4386 | 0.3032 | 0.6222 | 0.4049 | 0.5989 | 0.4392 |
| Number of countries = 70 | | | | | | | | |

*Note*: OLS standard errors adjusted for heteroskedasticity. OLS regression also controls for survey coverage and missing values in all variables except dummy variables.

**Table A8.** Results for trade shares.

| Independent variables | Pooled OLS | | Fixed effects | |
|---|---|---|---|---|
| | Coeff. | t-stat | Coeff. | t-stat |
| Log GDP | 2.659 | 12.001 | -0.146 | -0.469 |
| Female LFP | -0.080 | -5.920 | -0.020 | -0.457 |
| Log productivity ratio | 2.229 | 7.261 | 2.800 | 7.968 |
| Urban population | 0.037 | 4.593 | 0.185 | 8.162 |
| Age 0-14 | -0.257 | -6.366 | -0.233 | -3.769 |
| Age 65+ | -0.613 | -9.999 | 0.147 | 1.471 |
| Household final consumption | 0.115 | 8.844 | 0.064 | 4.806 |
| Exports | 0.020 | 4.948 | 0.012 | 1.647 |
| LF survey | 1.886 | 4.782 | 2.010 | 5.115 |
| Socialist | -7.142 | -13.180 | -1.092 | -2.521 |
| Constant | -12.754 | -4.031 | -6.470 | -1.445 |
| R-sq.: within | | | 0.5129 | |
| between | | | 0.1778 | |
| overall | 0.5320 | | 0.2914 | |

*Note*: OLS standard errors adjusted for heteroskedasticity. OLS regression also controls for survey coverage and missing values in all variables except dummy variables.

**Table A9.** Results for transport shares.

| Independent variables | Pooled OLS | | Fixed effects | |
|---|---|---|---|---|
| | Coeff. | t-stat | Coeff. | t-stat |
| Log GDP | -0.195 | -3.360 | -0.425 | -4.469 |
| Log productivity ratio | 0.312 | 2.624 | 1.061 | 5.732 |
| Urban population | 0.048 | 17.759 | 0.041 | 4.898 |
| Population density/1000 | 0.021 | 0.576 | 0.397 | 3.018 |
| Agriculture VA | -0.038 | -7.451 | -0.061 | -5.777 |
| Industry VA | -0.027 | -5.096 | -0.046 | -5.564 |
| LF survey | 0.588 | 4.542 | -0.781 | -5.301 |
| Socialist | 1.723 | 10.397 | 0.184 | 1.113 |
| Constant | 3.998 | 6.306 | 5.164 | 6.640 |
| R-sq.: within | | | 0.1861 | |
| between | | | 0.4542 | |
| overall | 0.4511 | | 0.5482 | |

*Note*: OLS standard errors adjusted for heteroskedasticity. OLS regression also controls for survey coverage and missing values in all variables except dummy variables.

**Table A10.** Results for the share of business services.

| Independent variables | Pooled OLS | | Fixed effects | |
|---|---|---|---|---|
| | Coeff. | t-stat | Coeff. | t-stat |
| Log GDP | 2.606 | 24.343 | 2.250 | 13.758 |
| Log productivity ratio | 0.772 | 3.634 | 3.791 | 10.263 |
| Urban population | 0.052 | 11.087 | -0.081 | -5.211 |
| Foreign direct investment | 0.100 | 4.380 | 0.071 | 3.831 |
| Agriculture VA | 0.038 | 3.393 | -0.063 | -3.319 |
| Industry VA | -0.071 | -7.501 | -0.215 | -13.224 |
| LF survey | 1.326 | 5.059 | -1.433 | -5.415 |
| Socialist | -0.851 | -2.054 | 0.480 | 1.657 |
| Constant | -23.613 | -19.711 | -17.249 | -12.172 |
| R-sq.: within | | | 0.5844 | |
| between | | | 0.3237 | |
| overall | 0.6376 | | 0.4325 | |

*Note*: OLS standard errors adjusted for heteroskedasticity. OLS regression also controls for survey coverage and missing values in all variables except dummy variables.

**Table A11.** Results for the share of social services.

| Independent variables | Pooled OLS | | Fixed effects | |
|---|---|---|---|---|
| | Coeff. | t-stat | Coeff. | t-stat |
| Log GDP | 1.203 | 3.392 | -0.441 | -1.170 |
| Female LFP | -0.076 | -3.682 | 0.179 | 3.432 |
| Log productivity ratio | 7.000 | 14.665 | 3.679 | 8.835 |
| Urban population | 0.118 | 11.490 | 0.052 | 1.885 |
| Government final consumption | 0.357 | 13.675 | 0.035 | 1.341 |
| Age 0-14 | 0.414 | 8.025 | 0.084 | 1.135 |
| Age 65+ | 0.928 | 12.175 | 0.825 | 6.946 |
| LF survey | 4.463 | 10.141 | 2.614 | 6.227 |
| Socialist | -1.553 | -1.985 | -2.068 | -4.206 |
| Constant | -51.709 | -11.198 | -11.113 | -2.102 |
| R-sq.: within | | | 0.3864 | |
| between | | | 0.4097 | |
| overall | 0.6423 | | 0.4503 | |

*Note*: OLS standard errors adjusted for heteroskedasticity. OLS regression also controls for survey coverage and missing values in all variables except dummy variables.

**Table A12.** Comparison of the goods and service sector employment.

| | 1994 | | 1996 | | 1998 | | 2000 | |
|---|---|---|---|---|---|---|---|---|
| | Goods | Services | Goods | Services | Goods | Services | Goods | Services |
| Average age, years | 39.3 | 38.5 | 40.0 | 38.2 | 40.3 | 38.3 | 39.6 | 38.1 |
| Age groups | | | | | | | | |
| <=25 | 12.8 | 15.7 | 11.9 | 17.6 | 12.7 | 16.6 | 15.0 | 17.0 |
| 26-35 | 26.0 | 29.3 | 22.9 | 27.2 | 19.9 | 26.8 | 21.7 | 27.2 |
| 36-45 | 32.7 | 26.7 | 34.5 | 27.9 | 34.9 | 29.8 | 31.4 | 28.8 |
| 46-55 | 18.8 | 17.8 | 20.6 | 16.4 | 20.9 | 17.5 | 23.8 | 19.5 |
| 56-65 | 8.6 | 9.1 | 9.2 | 9.4 | 10.6 | 7.6 | 7.7 | 6.1 |
| >65 | 1.0 | 1.5 | 1.0 | 1.5 | 1.0 | 1.7 | 0.8 | 1.4 |
| Gender (% of males) | 60.5 | 39.3 | 60.3 | 38.5 | 62.7 | 36.6 | 62.8 | 36.0 |
| Location (% of urban) | 73.0 | 83.6 | 71.4 | 83.8 | 72.9 | 82.6 | 70.7 | 80.3 |
| Education | | | | | | | | |
| Primary (0-6 years) | 3.6 | 1.8 | 2.6 | 1.5 | 1.3 | 1.2 | 1.2 | 0.4 |
| Incomplete secondary | 16.8 | 11.3 | 13.7 | 7.9 | 13.9 | 7.0 | 13.4 | 7.2 |
| Complete secondary | 44.7 | 30.8 | 46.7 | 33.5 | 48.5 | 36.0 | 48.9 | 36.8 |
| College | 21.1 | 26.7 | 23.5 | 29.0 | 22.4 | 27.7 | 22.9 | 28.0 |
| University and graduate | 13.8 | 29.4 | 13.5 | 28.0 | 14.0 | 28.1 | 13.6 | 27.7 |
| Occupation | | | | | | | | |
| Senior managers | 1.5 | 2.0 | 0.6 | 1.6 | 3.0 | 6.7 | 5.6 | 6.6 |
| Professionals | 11.9 | 26.2 | 10.1 | 24.9 | 9.8 | 23.8 | 8.0 | 22.9 |
| Technicians | 8.6 | 20.3 | 9.7 | 20.4 | 11.5 | 17.6 | 10.4 | 18.3 |
| Clerks | 5.1 | 7.2 | 5.3 | 7.9 | 5.0 | 6.8 | 5.0 | 5.8 |
| Service workers | 1.9 | 12.1 | 1.7 | 12.9 | 1.3 | 15.6 | 1.3 | 18.2 |
| Skilled agricultural workers | 1.1 | 0.2 | 1.5 | --- | 1.0 | --- | 1.5 | 0.2 |
| Graft workers | 31.7 | 7.5 | 28.0 | 7.7 | 25.5 | 5.4 | 26.4 | 5.4 |
| Operators | 24.3 | 12.9 | 27.7 | 10.9 | 29.0 | 11.3 | 27.0 | 12.0 |
| Elementary occupations | 14.0 | 10.4 | 15.1 | 11.1 | 13.9 | 10.8 | 14.7 | 8.9 |
| Military specialists | --- | 1.3 | 0.05 | 2.4 | 0.06 | 2.0 | --- | 1.7 |

**Table A13.** Differences in the sectoral distribution of employment by gender, age and education.

| Sector | 1994 | | | | |
|---|---|---|---|---|---|
| | % of males | Average age | Youths | Low skill | High skill |
| Agriculture | 65.6 | 38.9 | 14.4 | 28.9 | 8.7 |
| Industry | 58.8 | 39.4 | 12.2 | 17.6 | 15.5 |
| Services | 39.3 | 38.5 | 15.7 | 13.1 | 29.4 |
| Transport | 73.4 | 39.4 | 11.1 | 21.5 | 13.0 |
| Communication | 39.6 | 42.0 | 11.3 | 22.6 | 7.6 |
| Trade | 29.9 | 36.1 | 19.5 | 14.2 | 17.7 |
| Commerce | 64.6 | 35.4 | 18.9 | 14.2 | 38.6 |
| Municipal utilities | 53.8 | 40.4 | 9.9 | 25.9 | 8.0 |
| Health | 18.8 | 39.5 | 16.4 | 12.6 | 25.8 |
| Education | 17.2 | 37.9 | 16.8 | 8.4 | 47.5 |
| Culture | 25.8 | 36.7 | 16.7 | 7.6 | 25.8 |
| Science | 49.6 | 45.0 | 4.1 | 6.6 | 65.3 |
| Finance | 15.8 | 35.8 | 26.3 | 3.5 | 35.1 |
| Administration | 29.1 | 39.0 | 15.4 | 5.1 | 42.7 |
| Public security | 72.8 | 36.1 | 20.4 | 5.2 | 34.6 |
| Total employment | 49.6 | 38.8 | 14.3 | 16.6 | 21.9 |

| Sector | 2000 | | | | |
|---|---|---|---|---|---|
| | % of males | Average age | Youths | Low skill | High skill |
| Agriculture | 63.2 | 38.2 | 17.2 | 22.5 | 7.9 |
| Industry | 62.7 | 40.0 | 13.9 | 12.1 | 15.4 |
| Services | 36.0 | 38.1 | 17.0 | 7.6 | 27.7 |
| Transport | 73.0 | 38.1 | 13.5 | 11.7 | 10.7 |
| Communication | 32.6 | 40.1 | 16.3 | 16.3 | 9.3 |
| Trade | 23.7 | 35.5 | 24.1 | 9.0 | 14.5 |
| Commerce | 54.4 | 35.6 | 19.0 | 7.2 | 24.1 |
| Municipal utilities | 49.1 | 41.1 | 12.1 | 14.3 | 13.4 |
| Health | 13.6 | 38.0 | 16.8 | 6.5 | 26.4 |
| Education | 15.6 | 40.0 | 15.0 | 4.3 | 48.5 |
| Culture | 29.5 | 38.9 | 20.5 | 6.8 | 34.1 |
| Science | 50.9 | 46.4 | 7.0 | 7.0 | 57.9 |
| Finance | 22.4 | 36.1 | 10.2 | 2.0 | 46.9 |
| Administration | 28.6 | 39.2 | 17.9 | 2.7 | 39.3 |
| Public security | 70.7 | 35.1 | 17.0 | 2.7 | 39.9 |
| Total employment | 47.9 | 38.6 | 16.0 | 10.5 | 21.7 |

*Notes*: Youths = % of employees aged under 25.

Low skill = % of employees with less than secondary education (primary or incomplete secondary).

High skill = % of employees with university education and higher.

**Table A14.** Changing composition and gross flows of service employment in 1994-1996.

| Service sub-sector | 1994 | Gross outflows | Gross inflows | Gross turnover | Net inflows | 1996 |
|---|---|---|---|---|---|---|
| | % of total | % of employed in that sub-sector in 1994 | | | | % of total |
| Transport | 12.6 | 25.7 | 17.8 | 43.5 | -7.9 | 11.5 |
| Communication | 2.8 | 25.5 | 21.3 | 46.8 | -4.3 | 2.6 |
| Trade | 14.9 | 43.7 | 40.5 | 84.1 | -3.2 | 14.2 |
| Commerce | 3.7 | 41.3 | 98.4 | 139.7 | 57.1 | 5.8 |
| Municipal utilities | 8.4 | 27.5 | 38.7 | 66.2 | 11.3 | 9.2 |
| Health | 15.1 | 19.9 | 17.2 | 37.1 | -2.7 | 14.5 |
| Education | 19.9 | 19.0 | 19.3 | 38.3 | 0.3 | 19.7 |
| Culture | 3.0 | 24.0 | 36.0 | 60.0 | 12.0 | 3.3 |
| Science | 4.7 | 28.8 | 6.3 | 35.0 | -22.5 | 3.6 |
| Finance | 2.2 | 18.4 | 39.5 | 57.9 | 21.1 | 2.7 |
| Administration | 5.2 | 17.0 | 22.7 | 39.8 | 5.7 | 5.4 |
| Public security | 7.4 | 22.2 | 23.0 | 45.2 | 0.8 | 7.4 |
| Total | 100.0 | 26.1 | 27.3 | 53.5 | 1.2 | 100.0 |
| Total number | 1,693 | 442 | 463 | 905 | 21 | 1,714 |

*Notes*: 1) The sample is restricted to those respondents who participated both in 1994 and 1996 rounds, but there are no age restrictions.

2) Gross outflows = number of workers employed in a service sub-sector in 1994 and no longer employed in that sub-sector in 1996.

Gross inflows = number of workers employed in a service sub-sector in 1996 who were not employed in that sub-sector in 1996.

Gross turnover = gross outflows plus gross inflows.

Gross inflows = gross inflows minus gross outflows.

**Table A15.** Changing composition and gross flows of service employment in 1996-1998.

| Service sub-sector | 1996 | Gross outflows | Gross inflows | Gross turnover | Net inflows | 1998 |
|---|---|---|---|---|---|---|
| | % of total | % of employed in that sub-sector in 1996 | | | | % of total |
| Transport | 11.0 | 19.5 | 21.0 | 40.5 | 1.5 | 11.3 |
| Communication | 2.7 | 24.5 | 14.3 | 38.8 | -10.2 | 2.5 |
| Trade | 14.4 | 42.9 | 45.6 | 88.5 | 2.7 | 14.9 |
| Commerce | 6.5 | 51.3 | 41.9 | 93.2 | -9.4 | 5.9 |
| Municipal utilities | 8.6 | 28.8 | 31.4 | 60.3 | 2.6 | 8.9 |
| Health | 15.2 | 16.4 | 23.3 | 39.6 | 6.9 | 16.3 |
| Education | 19.7 | 22.4 | 17.6 | 40.1 | -4.8 | 18.9 |
| Culture | 3.6 | 23.1 | 29.2 | 52.3 | 6.2 | 3.8 |
| Science | 3.3 | 20.0 | 8.3 | 28.3 | -11.7 | 3.0 |
| Finance | 2.4 | 25.0 | 20.5 | 45.5 | -4.5 | 2.3 |
| Administration | 4.9 | 22.7 | 26.1 | 48.9 | 3.4 | 5.1 |
| Public security | 7.8 | 24.6 | 15.5 | 40.1 | -9.2 | 7.2 |
| Total | 100.0 | 26.8 | 26.0 | 52.8 | -0.8 | 100.0 |
| Total number | 1,814 | 486 | 471 | 957 | -15 | 1,799 |

*Note*: The sample is restricted to those respondents who participated both in 1996 and 1998 rounds, but there are no age restrictions.

**Table A16.** Changing composition and gross flows of service employment in 1998-2000.

| Service sub-sector | 1998 | Gross outflows | Gross inflows | Gross turnover | Net inflows | 2000 |
|---|---|---|---|---|---|---|
| | % of total | % of employed in that sub-sector in 1998 | | | | % of total |
| Transport | 12.1 | 22.3 | 22.3 | 44.6 | 0.0 | 11.9 |
| Communication | 2.0 | 25.6 | 17.9 | 43.6 | -7.7 | 1.8 |
| Trade | 15.0 | 34.7 | 48.6 | 83.3 | 13.9 | 16.8 |
| Commerce | 6.4 | 38.5 | 54.1 | 92.6 | 15.6 | 7.2 |
| Municipal utilities | 8.9 | 32.7 | 33.9 | 66.7 | 1.2 | 8.9 |
| Health | 15.9 | 21.6 | 17.6 | 39.2 | -3.9 | 15.1 |
| Education | 19.2 | 19.8 | 17.1 | 36.9 | -2.7 | 18.4 |
| Culture | 3.8 | 20.8 | 23.6 | 44.4 | 2.8 | 3.8 |
| Science | 2.3 | 9.1 | 9.1 | 18.2 | 0.0 | 2.3 |
| Finance | 2.6 | 24.0 | 6.0 | 30.0 | -18.0 | 2.1 |
| Administration | 4.4 | 17.6 | 27.1 | 44.7 | 9.4 | 4.8 |
| Public security | 7.4 | 23.9 | 20.4 | 44.4 | -3.5 | 7.0 |
| Total | 100.0 | 25.2 | 26.9 | 52.1 | 1.7 | 100.0 |
| Total number | 1,921 | 484 | 516 | 1000 | 32 | 1,953 |

*Notes*: The sample is restricted to those respondents who participated both in 1998 and 2000 rounds, but there are no age restrictions.

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